WESTERN STATES ADJUDICATION CONFERENCE

Nebraska City, Nebraska

September 30 – October 2, 2002

A New Approach to Conjunctive Administration Of Surface and Ground Water

Dave Tuthill
Idaho Department of Water Resources

This presentation will be posted to the IDWR website. Start at

www.idwr.state.id.us

To request a copy on CD-ROM, send me an email

Discussion Items

- Definition
- Problem Statement – Review from last year
- Collaborative Spatial Decision-Making Approach
- Experiment Results
- Proposal for Application Elsewhere – “The New Approach”

Definition

Historically the term

Conjunctive Management

has been used to refer to both:

- The combined use of two or more independent sources for meeting one or more objectives such as reliability of supply, and

- Legal and hydrologic integration of administration of the diversion and use of water under water rights from ground and surface water.

Definition

We are beginning to use

Conjunctive Administration

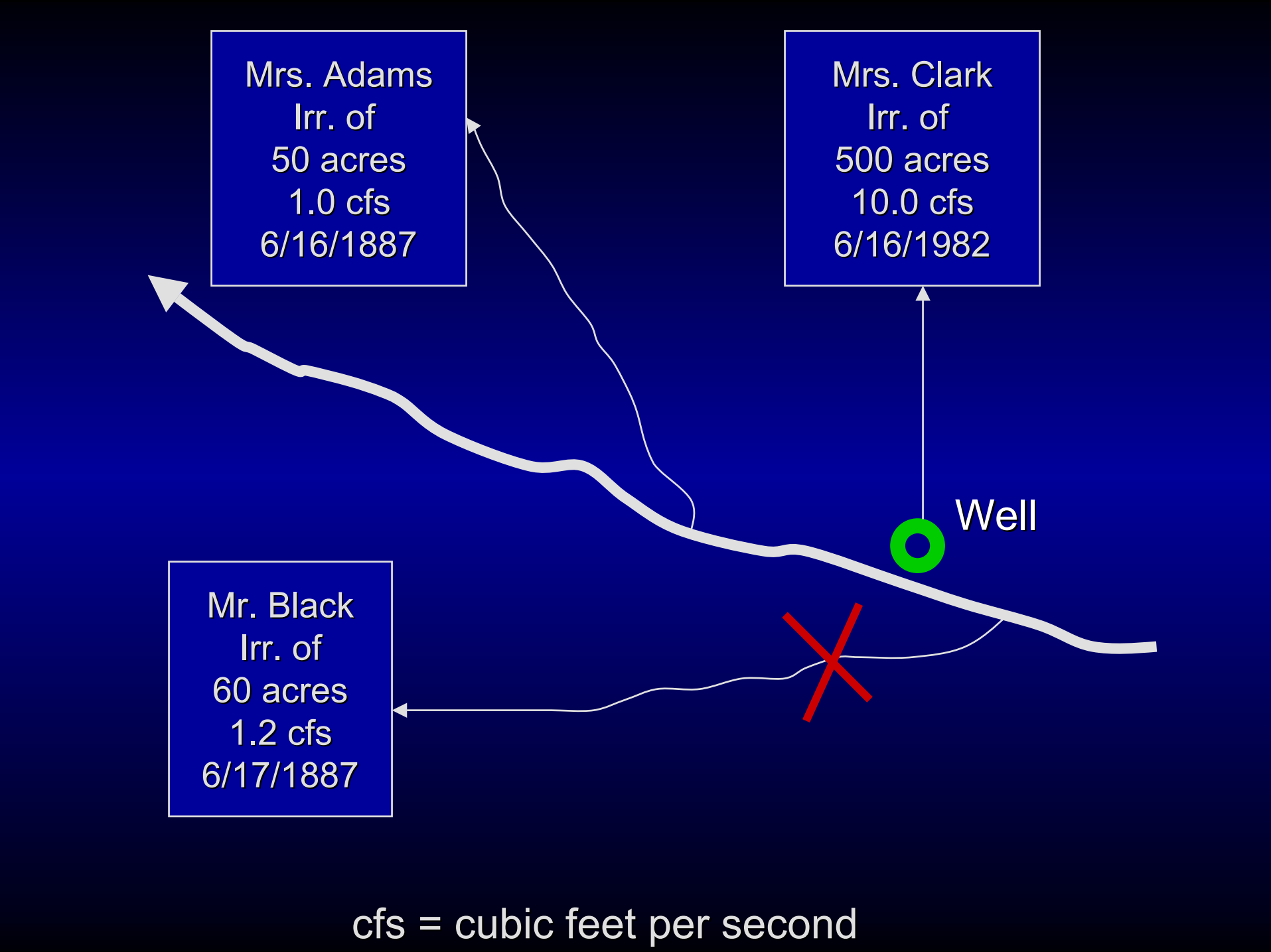
to mean

The legal and administrative integration of water rights that govern the diversion and use of water from hydraulically interconnected surface-water and ground-water sources in areas having a common ground water supply.

Basics of Water Rights in Idaho

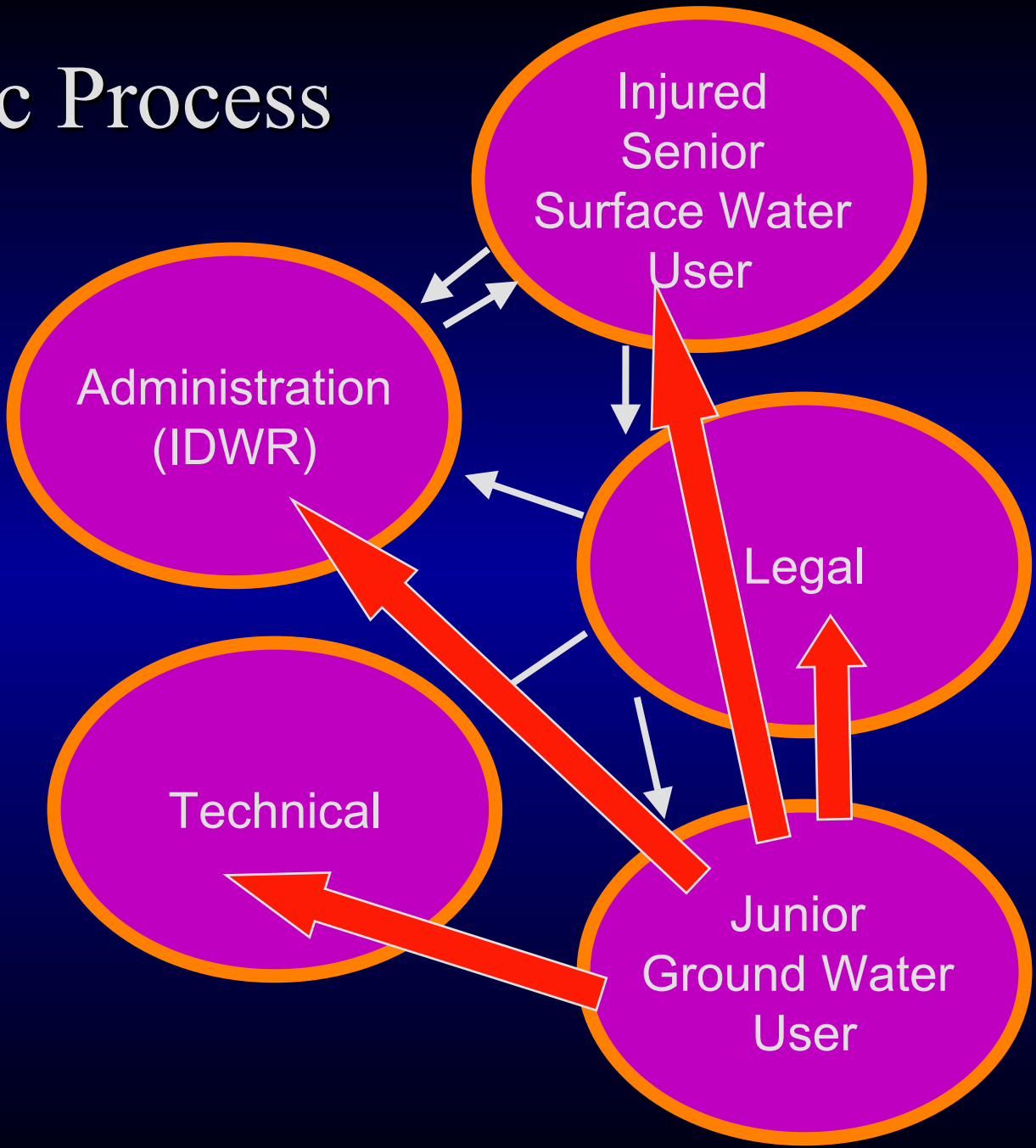
Most Western States (Including Idaho) -- Prior appropriation system --

"First in time is first in right"

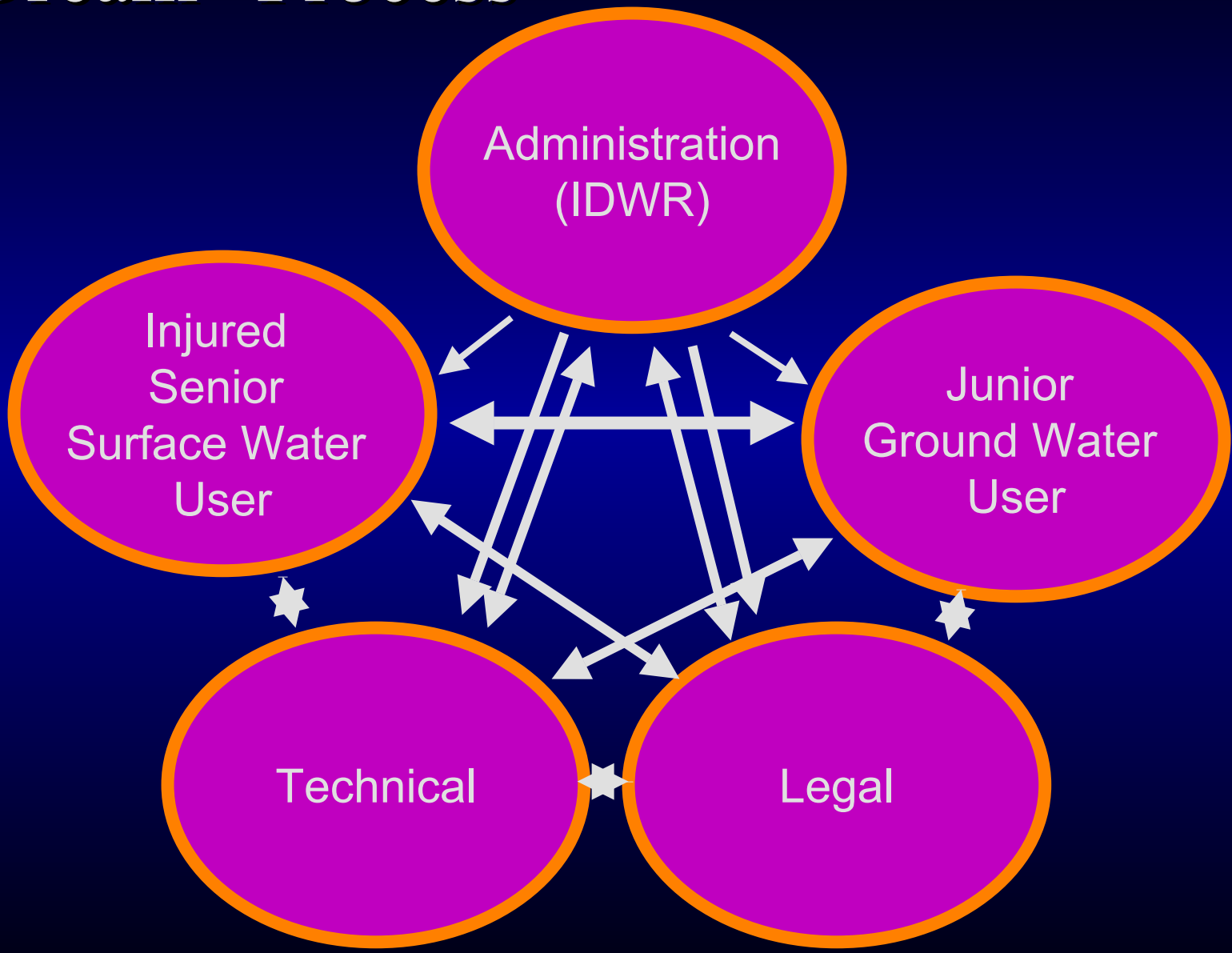


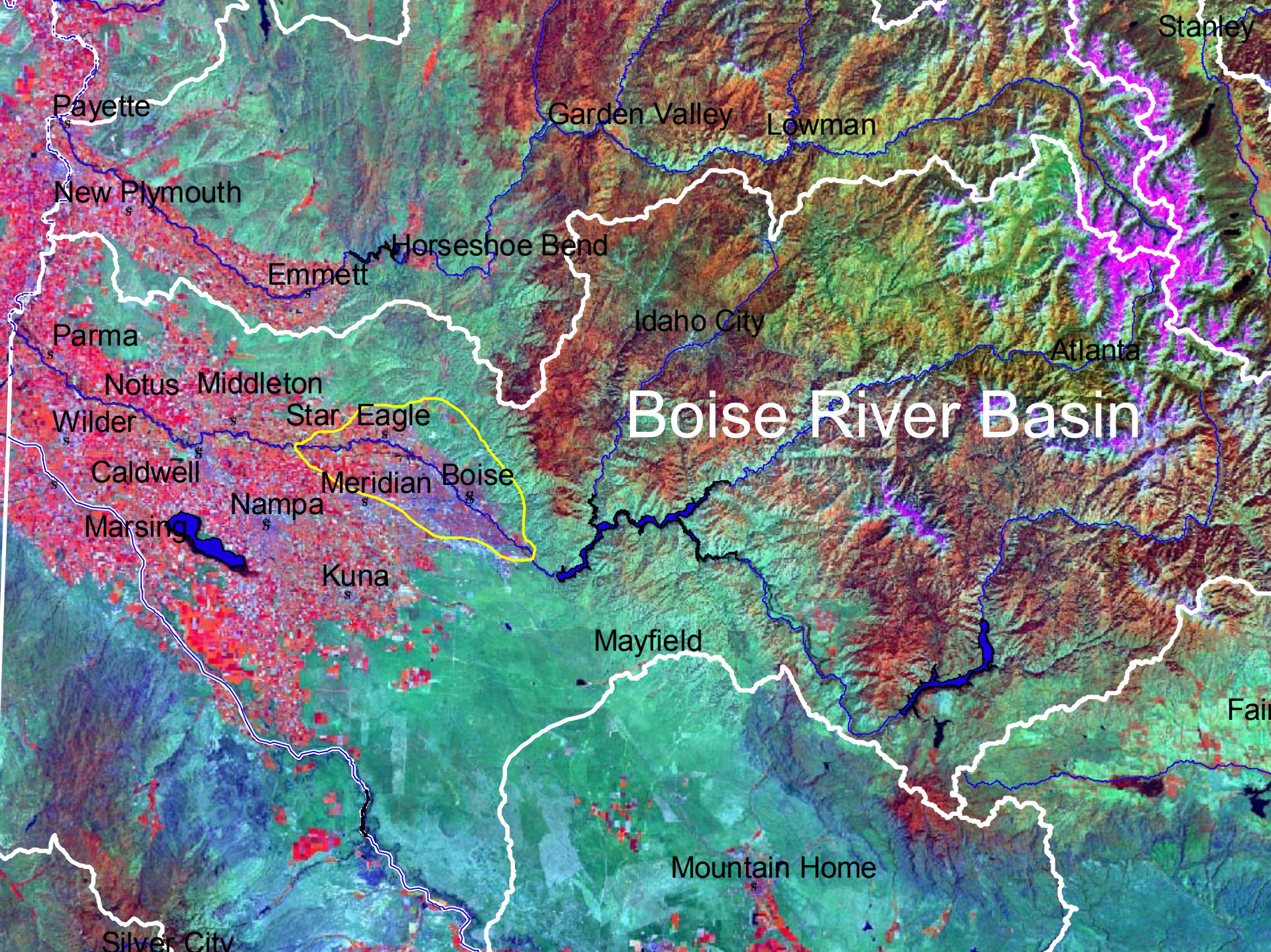
cfs = cubic feet per second

Classic Process



“Dream” Process

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Payette
Garden Valley
Lowman
New Plymouth
Horseshoe Bend
Emmett
Idaho City
Parma
Atlanta
Notus
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Wilder
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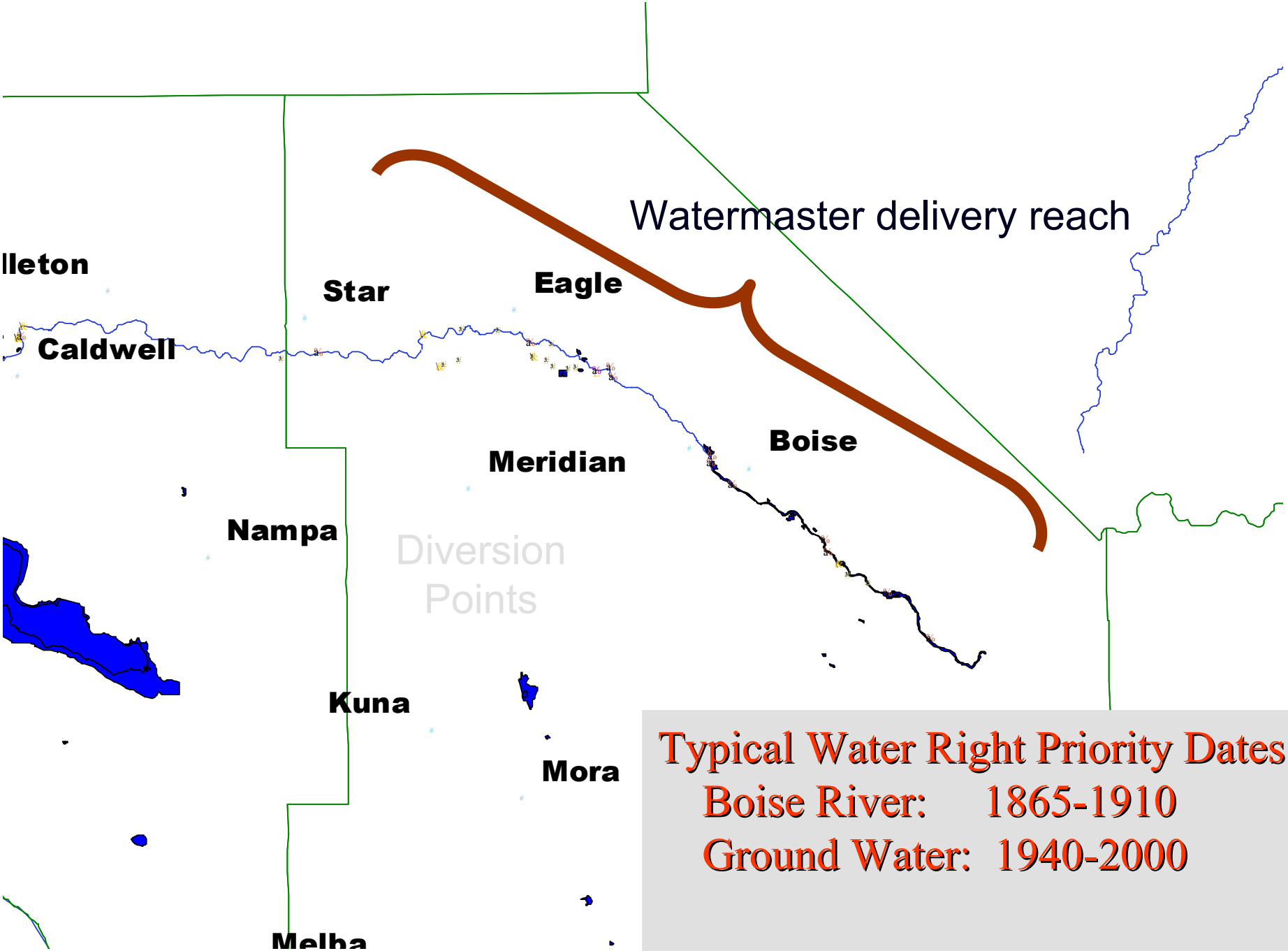
Eagle
Boise River Basin
Caldwell
Meridian
Boise
Nampa
Marsing
Kuna
Mayfield
Mountain Home
Silver City

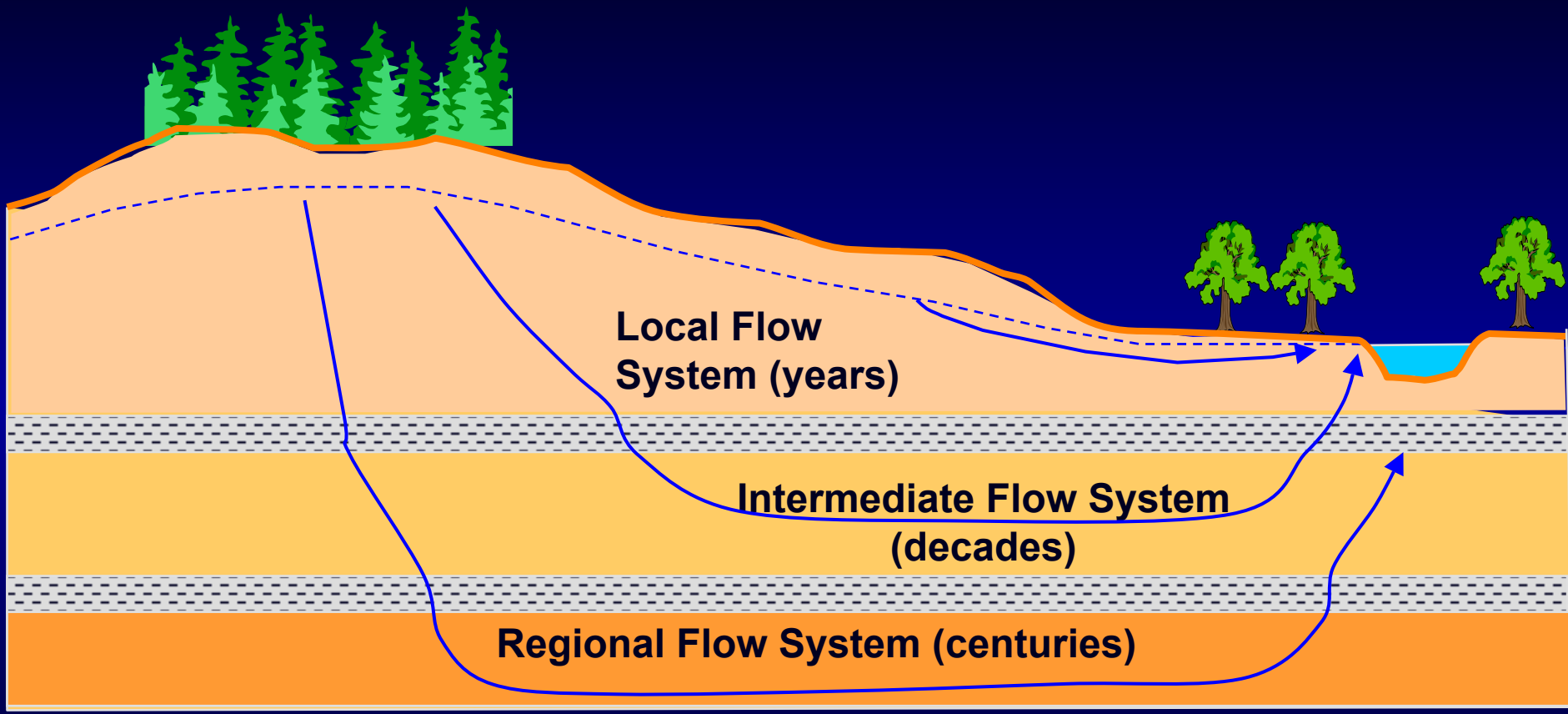


Typical Water Right Priority Dates:

Boise River: 1865-1910

Ground Water: 1940-2000

Ground Water Flow Systems

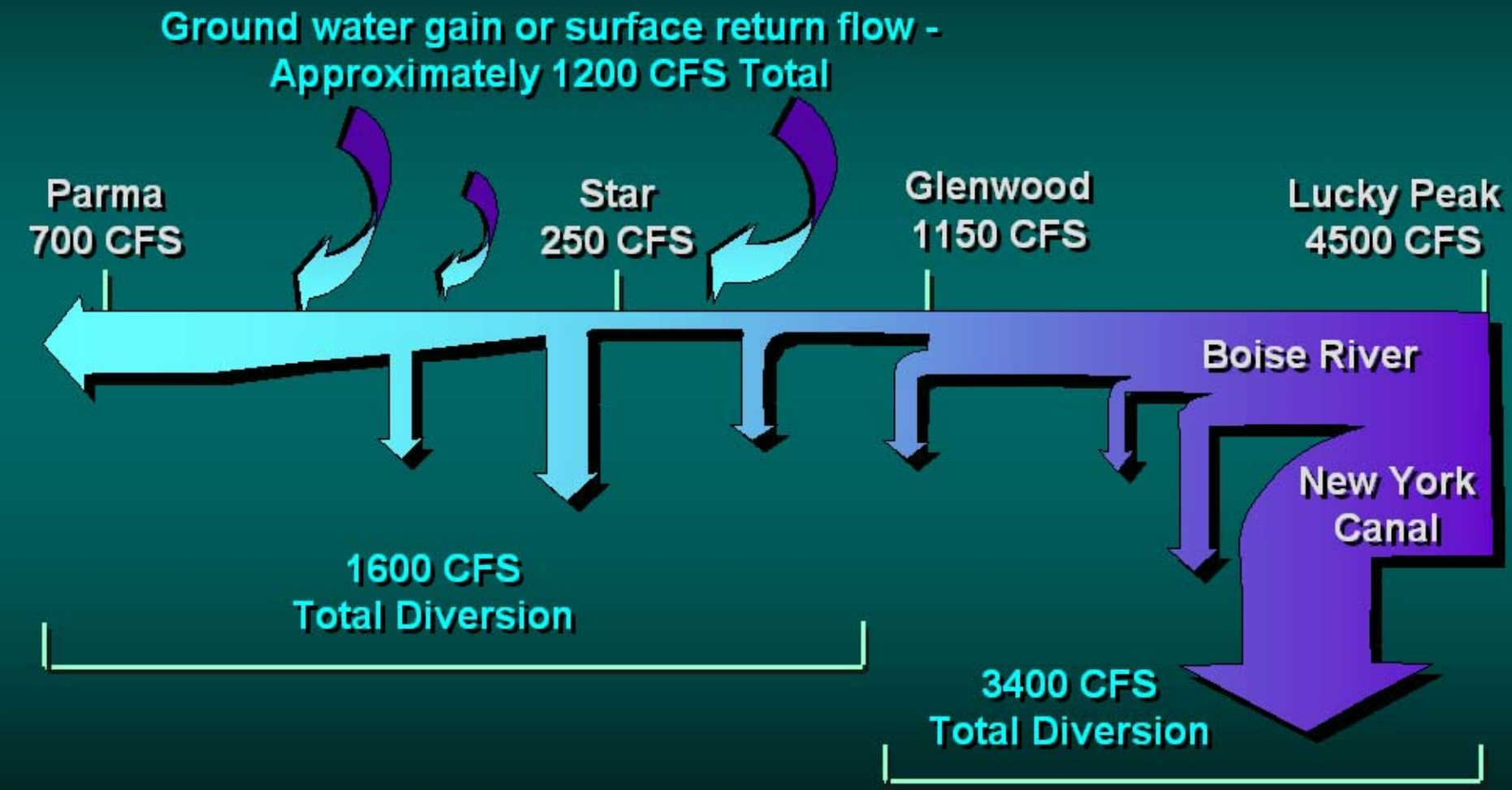


Why consider conjunctive relationship between ground water and surface water in the Boise River Basin?

Problem

With increases in ground water diversions within the Boise River Basin, water deliveries must consider conjunctive impacts (interactions between ground water and surface water) if fair delivery is to be achieved

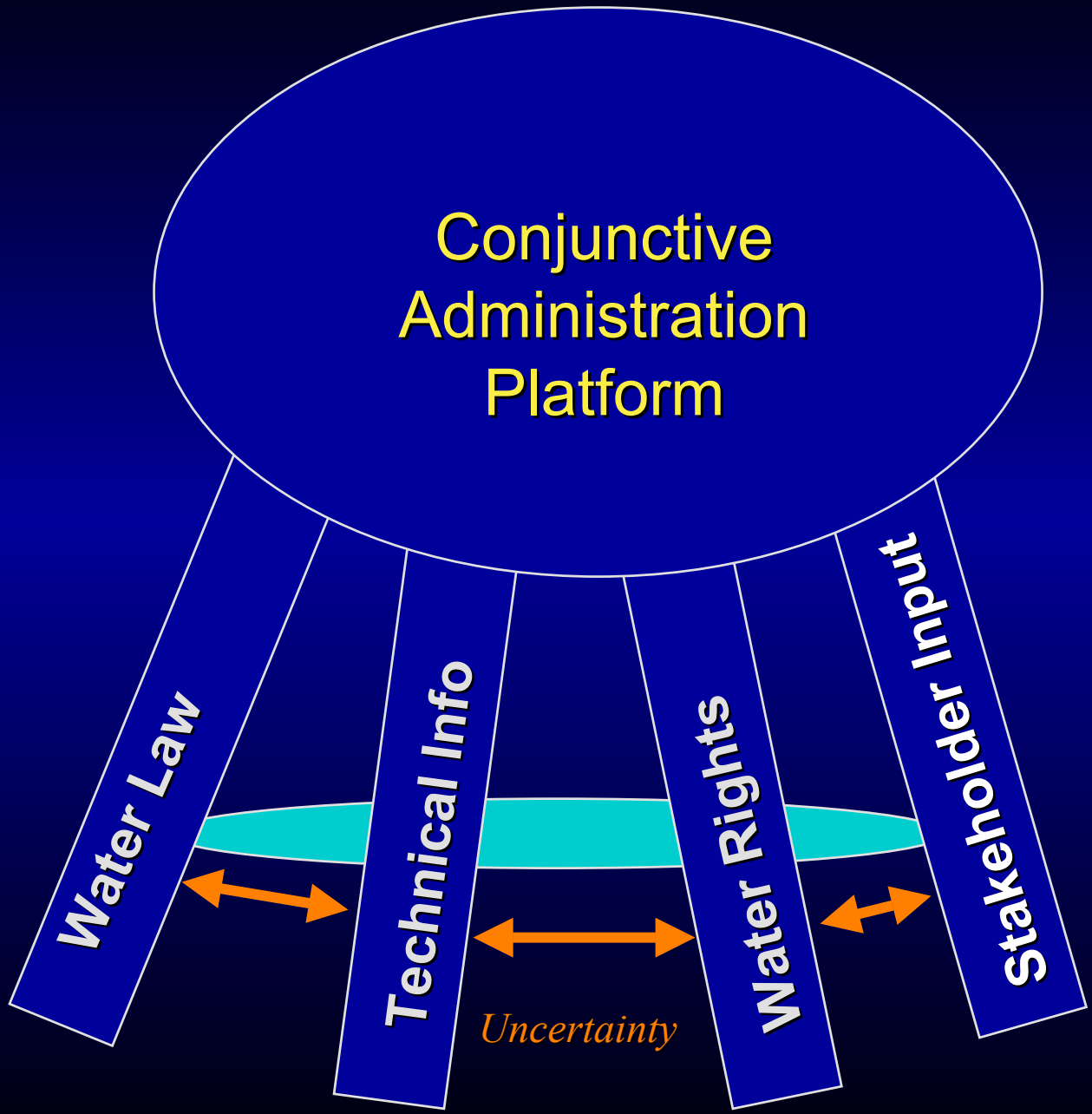
Boise River – Typical July Conditions



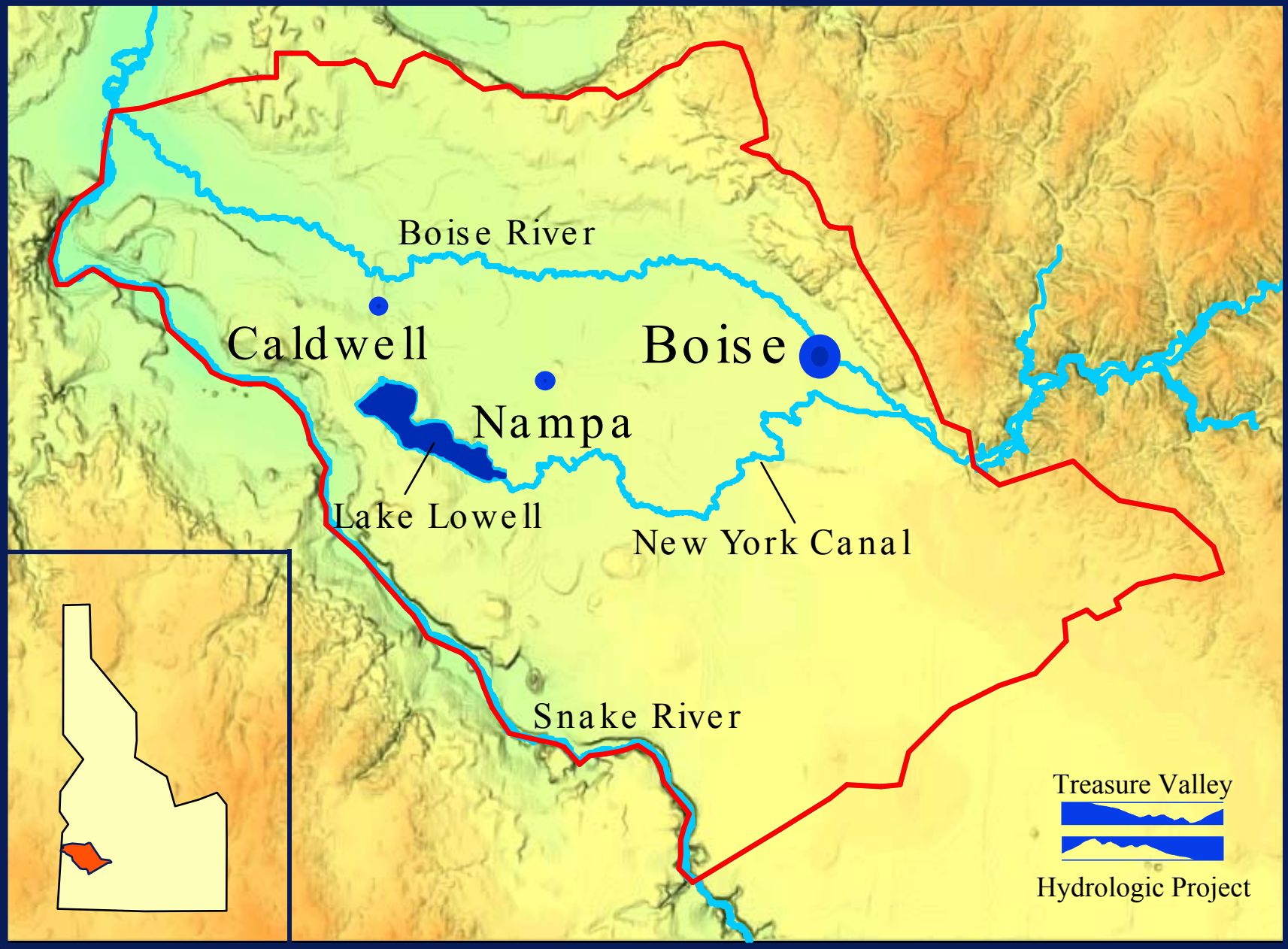
Adapted from graphic
by Bill Ondrechen, Idaho Department of Water Resources

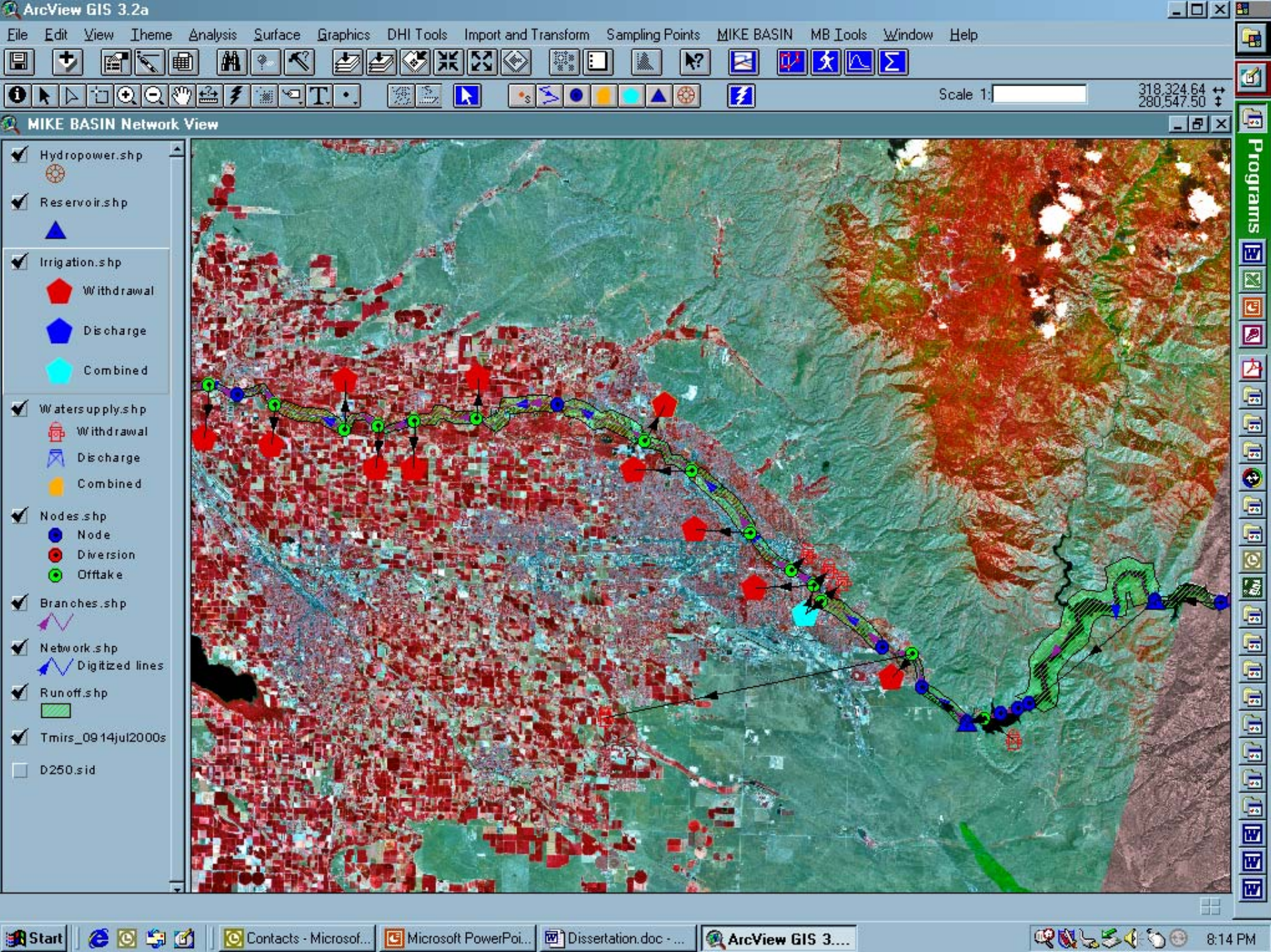
Ground Water Rights in the Boise River Basin CA Area

Basis	Primary Use	Count	Diversion Rate (cfs)
Beneficial Use	Irrigation	92	30.63
	Municipal	1	1.60
	Domestic/Stk	181	23.83
Permit	Irrigation	25	21.83
	Municipal	15	52.78
	Domestic/Stk	19	9.00
License	Irrigation	425	172.12
	Municipal	72	197.92
	Domestic/Stk	310	78.17
Decree	Irrigation	2	0.88
	Municipal	0	0.00
	Domestic/Stk	3452	159.75
Totals		4594	748.51


Conjunctive Administration Platform
Water Law
Technical Info
Water Rights
Stakeholder Input
Uncertainty

Treasure Valley Project Area

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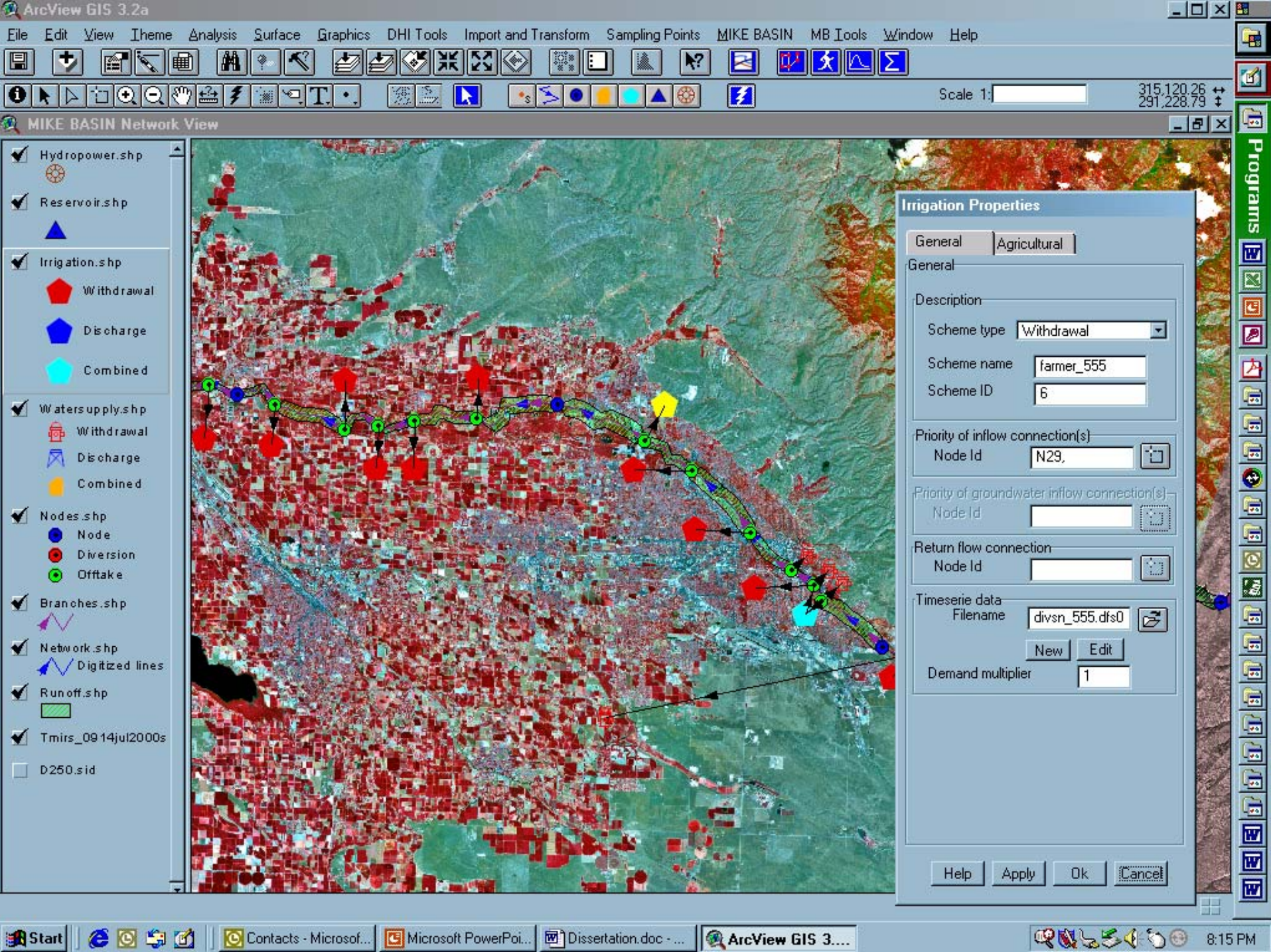
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Agricultural
General
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Scheme type
Withdrawal
Scheme name
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Scheme ID
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Priority of inflow connection(s)
Node Id
N29,
Priority of groundwater inflow connection(s)
Node Id
Return flow connection
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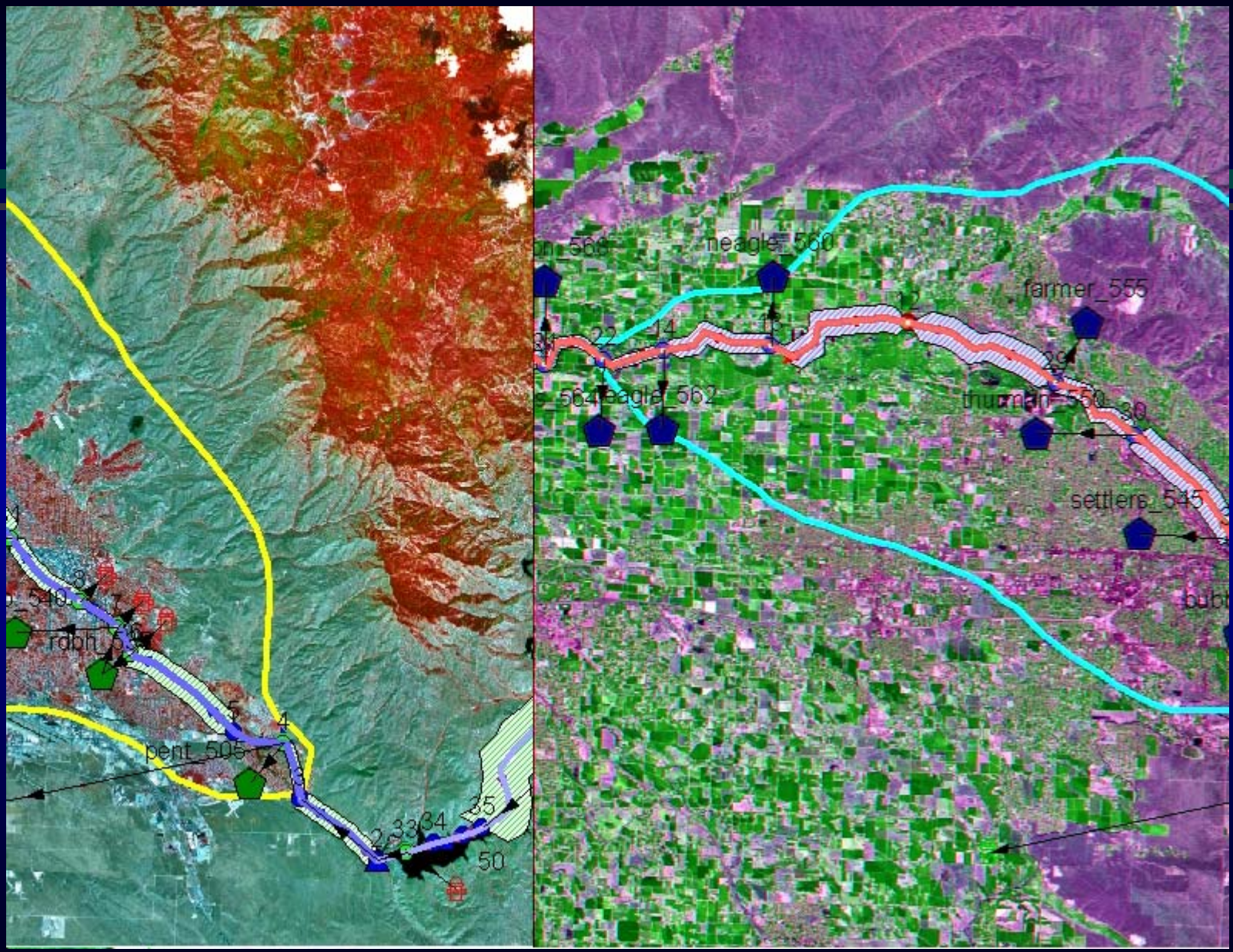
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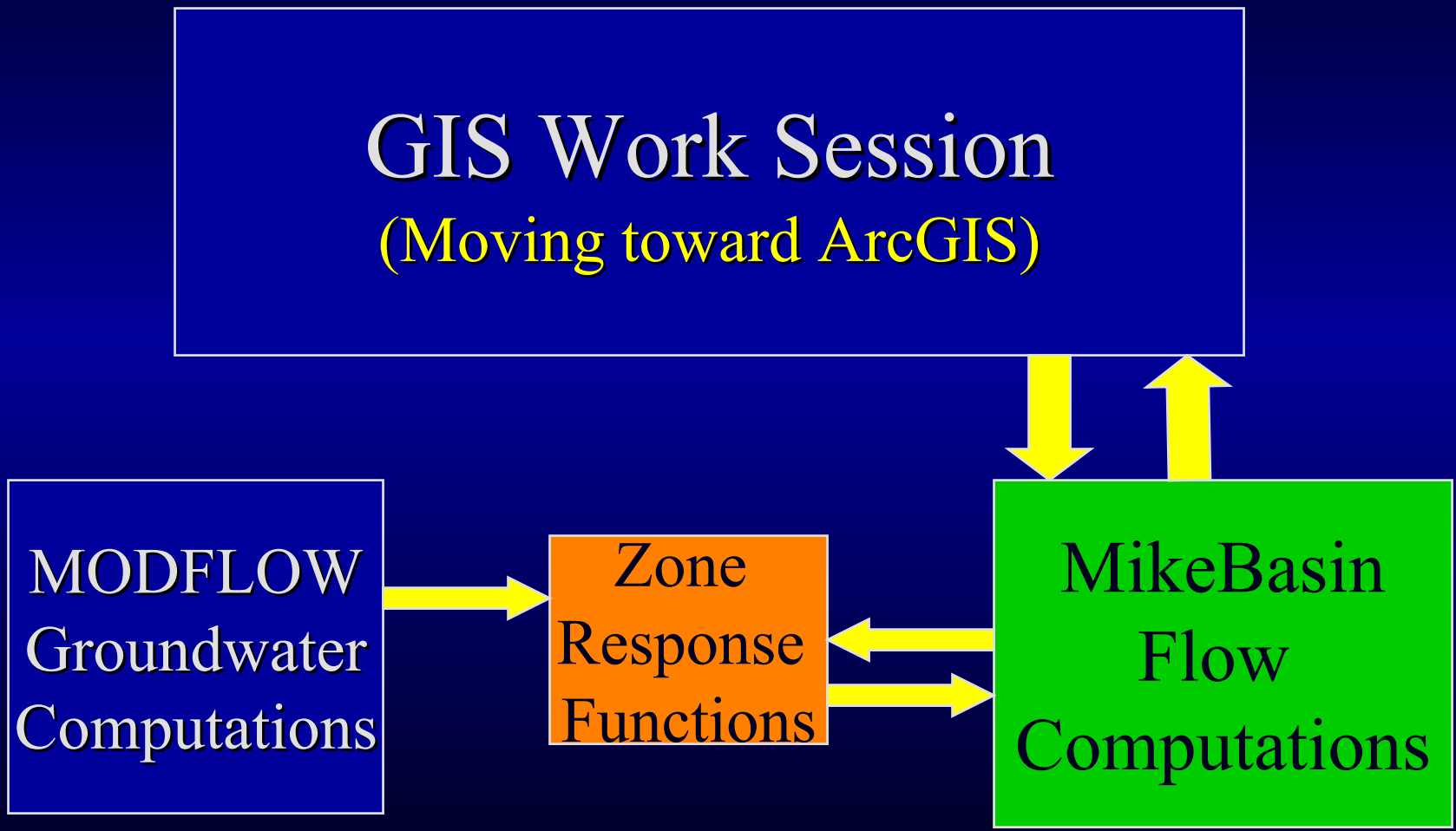
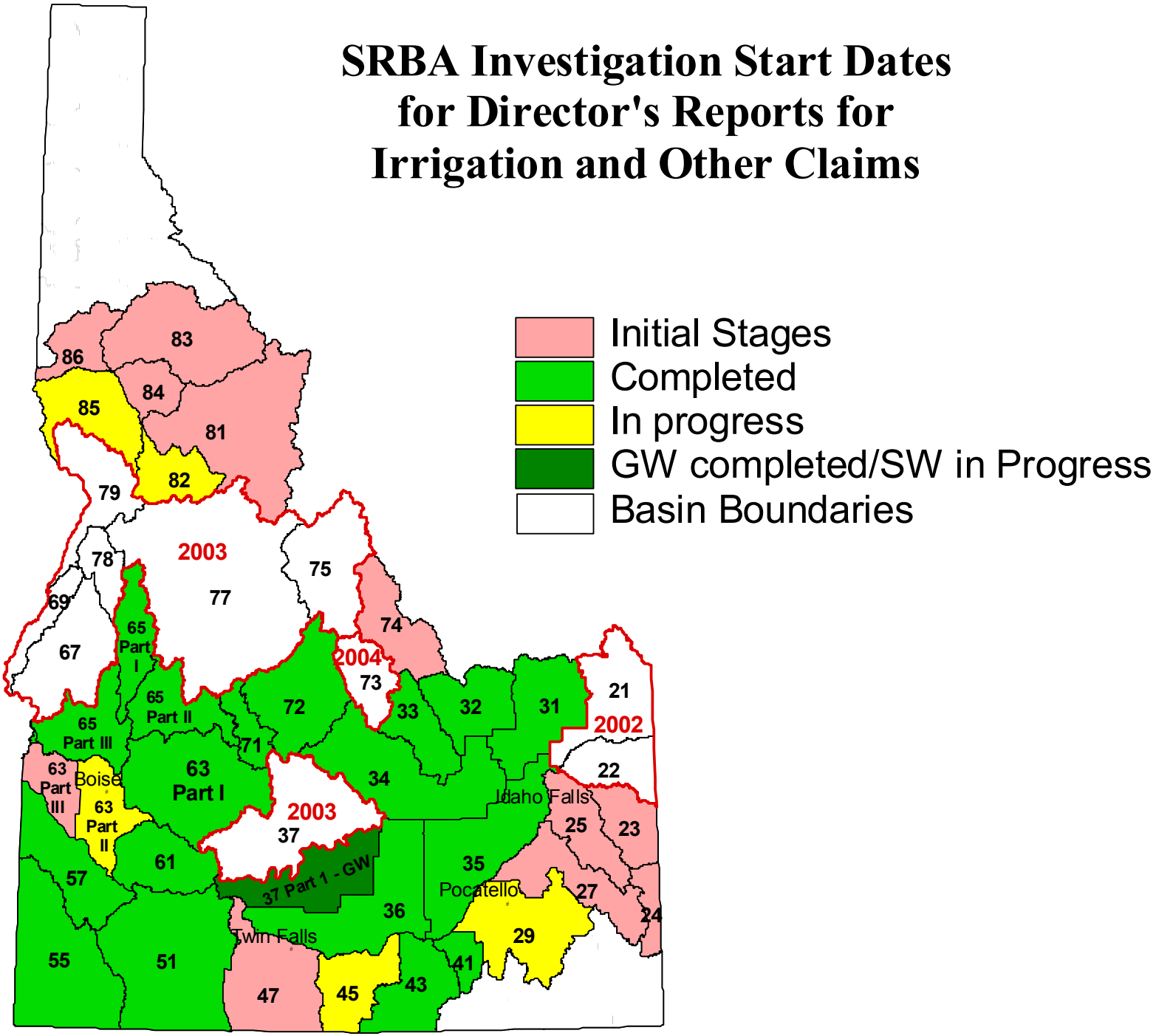
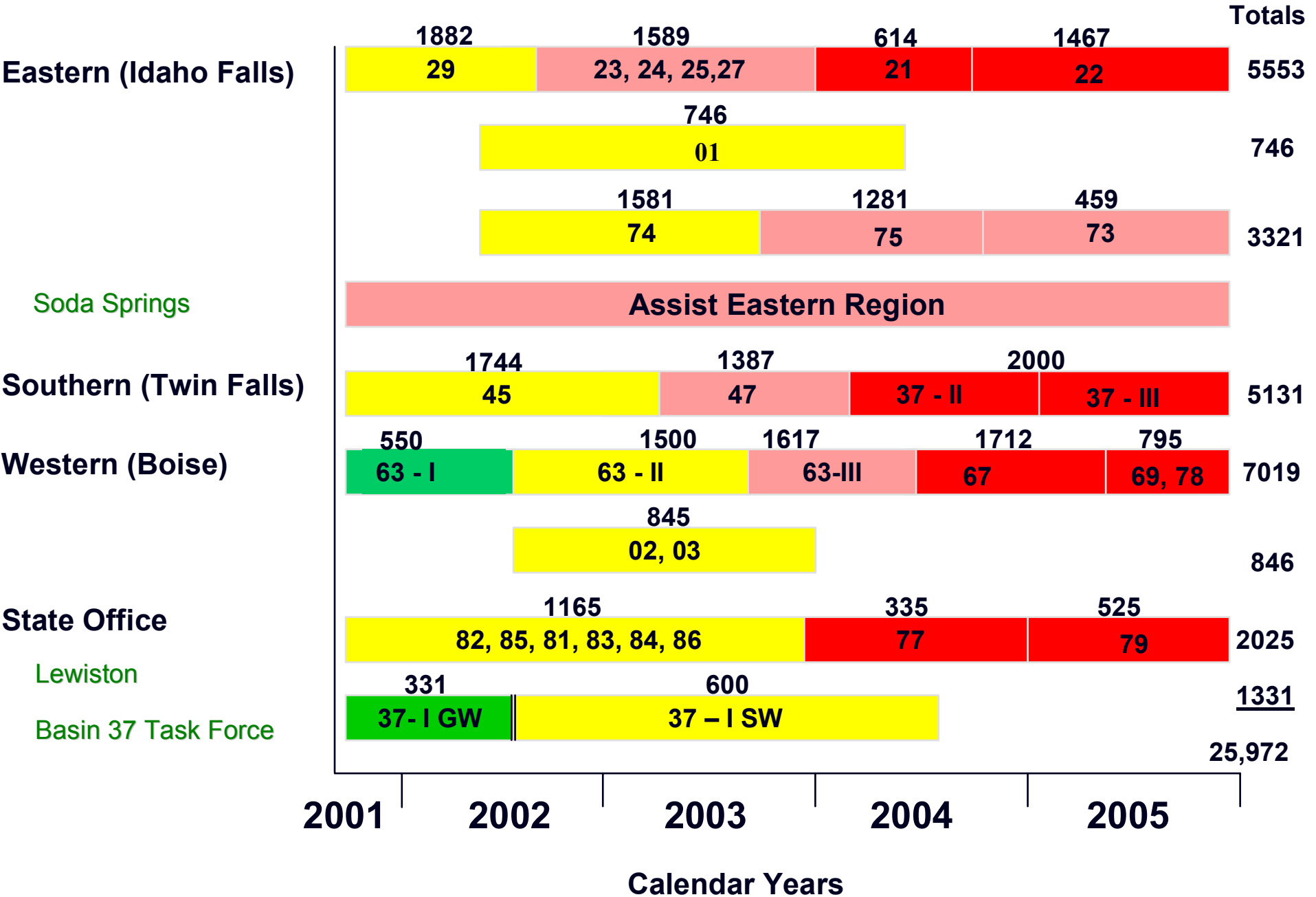
MikeBasin Conceptual Model Framework



SRBA Investigation Start Dates for Director's Reports for Irrigation and Other Claims



IDWR PROCESSING FORECAST
FOR REMAINING IRRIGATION AND OTHER STATE-BASED CLAIMS



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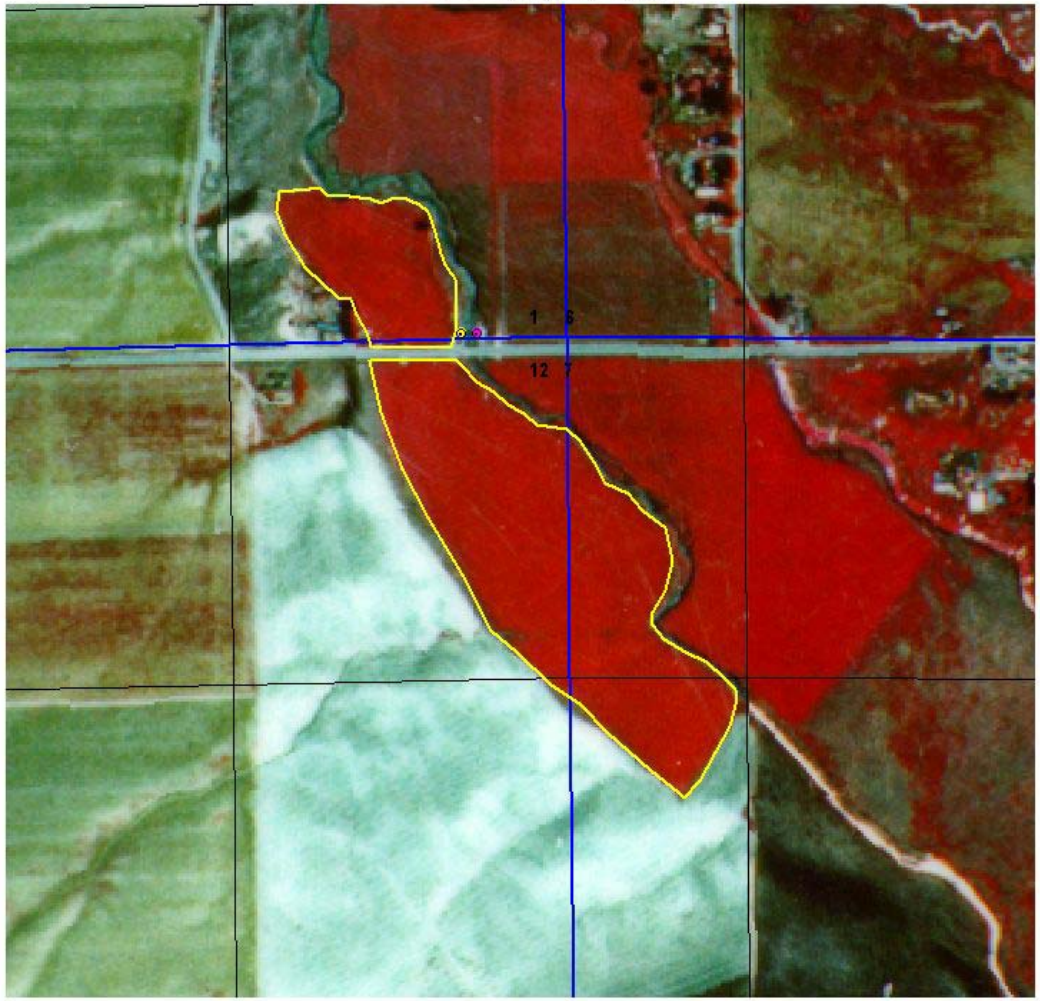

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T10S R30E SEC. 1 & 12
T10S R31E SEC. 7

RECOMMENDED PLACE OF USE
POINT OF DIVERSION
SECTION LINES
1/4 - 1/4 LINES

GIS PLACE OF USE PRESENTATION
1987 &/OR 1988 NAPP PHOTOGRAPHY

DATA ENTRY BY: STEVE CLELLAND
DATE: June 1, 1999

Decision by Director IDWR

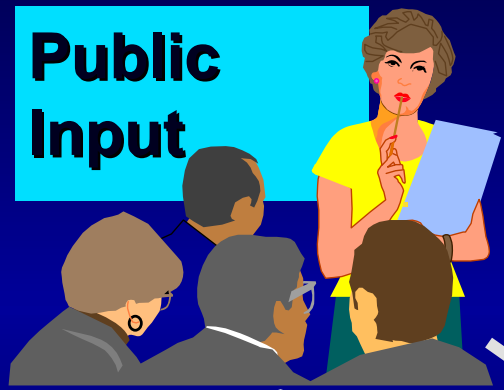
Implementation

Additional Meetings & Process as Required

No significant problems with the approach

Initial Legal and Technical Meetings 11/15-16/2001

Initial Stakeholder Meetings 5/17-18 2001



Conjunctive Administration Decision Platform

Steps Identified from May 2001 Stakeholder Sessions

- ✓ Obtain direction from Director IDWR
- ✓ Analyze survey data with respect to previous studies by other researchers
- ✓ Conduct discussion sessions with attorneys and additional technical staff (Fall 2001)
- ✓ Conduct additional lithographic and geochemical analysis in the Boise to Star area
- ✓ Use 3D Analyst to depict layers
- ✓ Notify the general public of this initiative at the Treasure Valley Water Summit (Jan 02)
- ✓ Conduct a follow-up session with the stakeholders (Sept 2002)

Boise River Basin Conjunctive Administration Group Meetings

UNIVERSITY OF WASHINGTON

Introduction to Activities for the Day

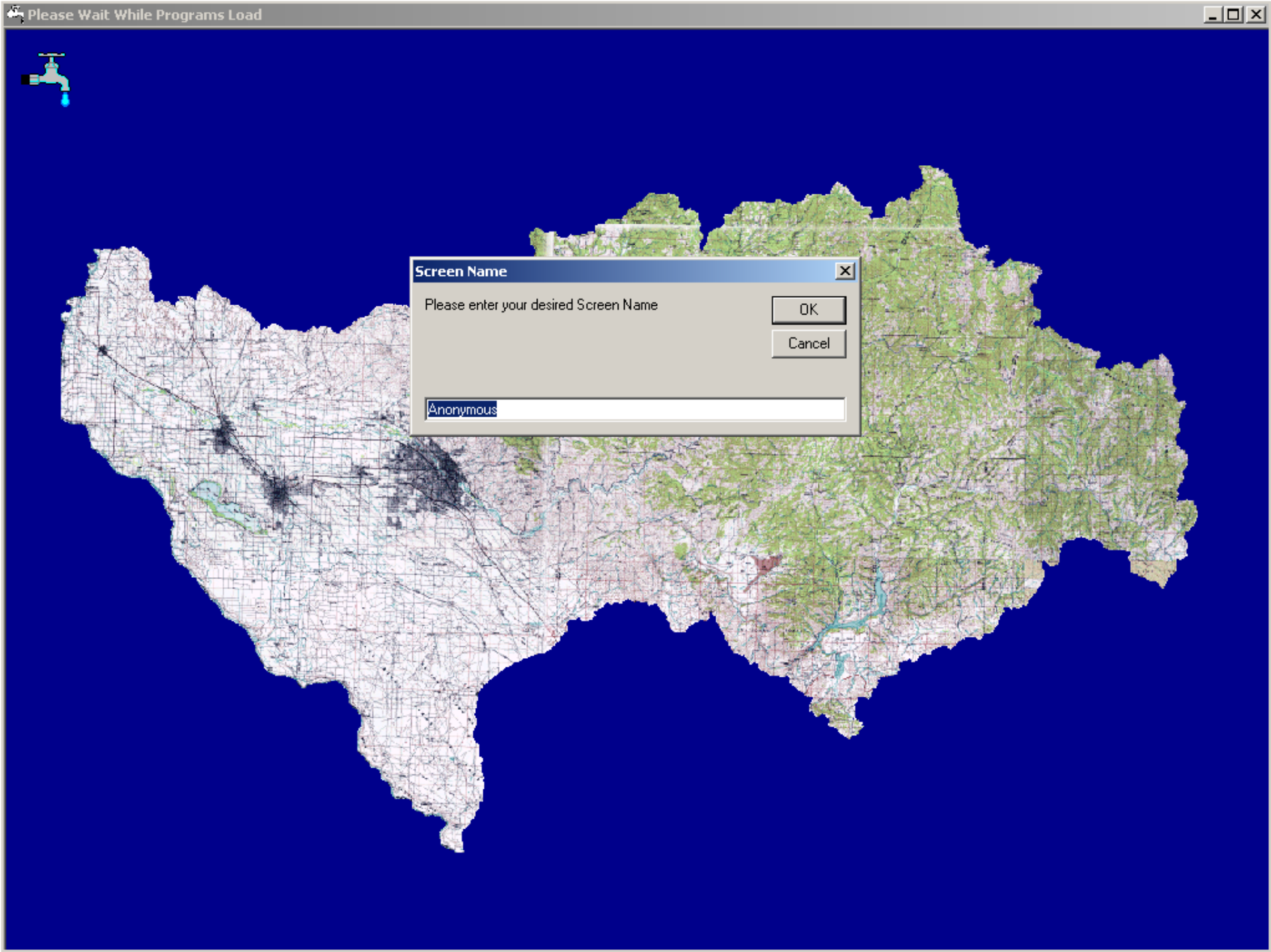
September 19 and 20, 2002

Presentation by
Dave Tuthill
Idaho Department of Water Resources Researcher

Phase 2
Collaborative Spatial Decision-Making Session
September 19-20, 2002


Boise River Watershed
PRECIPITATION
(inches per year)
Lower Boise River Basin


WEAR
IT FOR LIFE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Images

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Wells | Study Area

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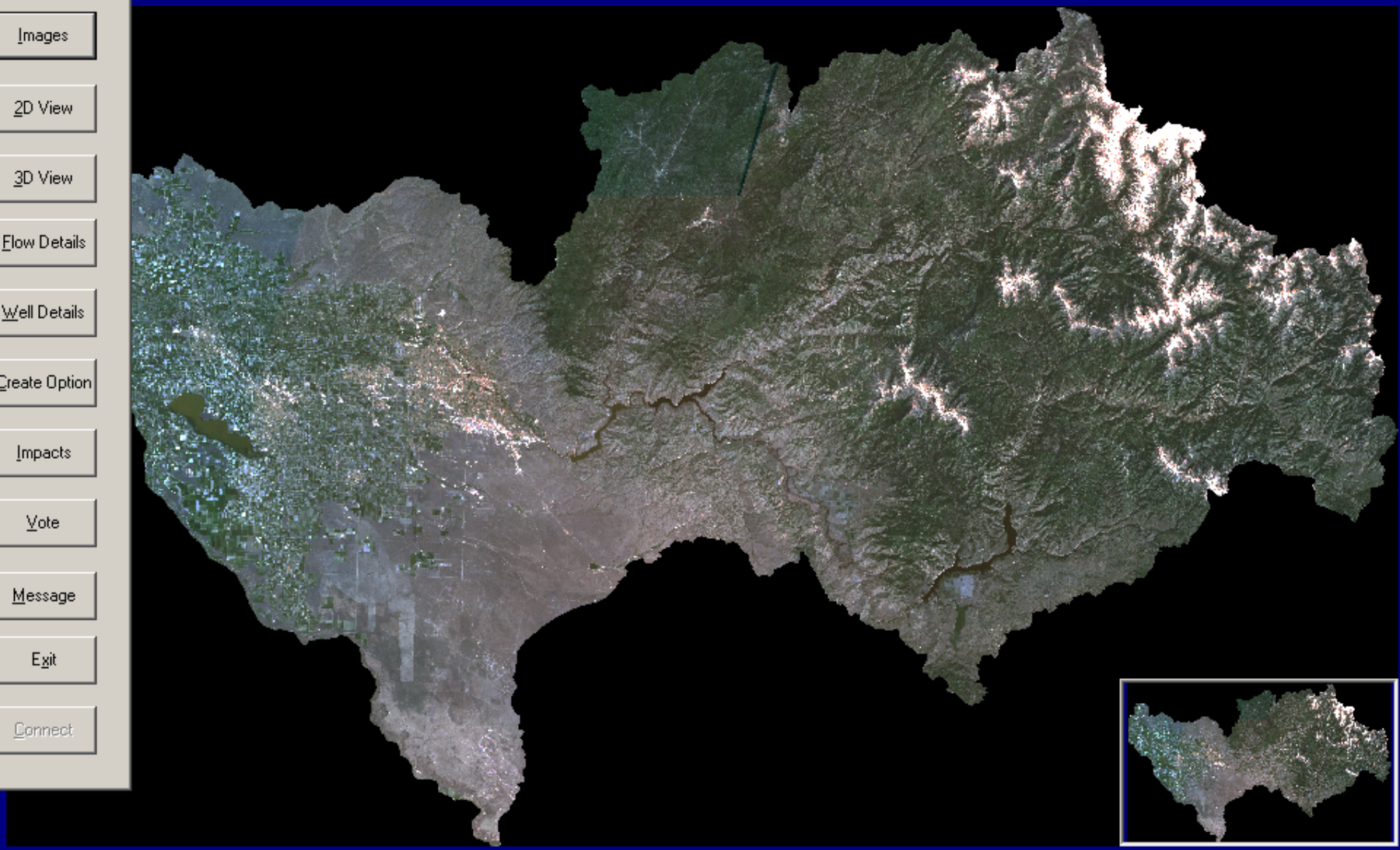

Boise River Basin - Landsat (30 meter resolution) Image

Basin Image | Basin Topo | Five Meter | One Meter

Close

Images

Zoom-Out | Pan | Full

Wells | Study Area

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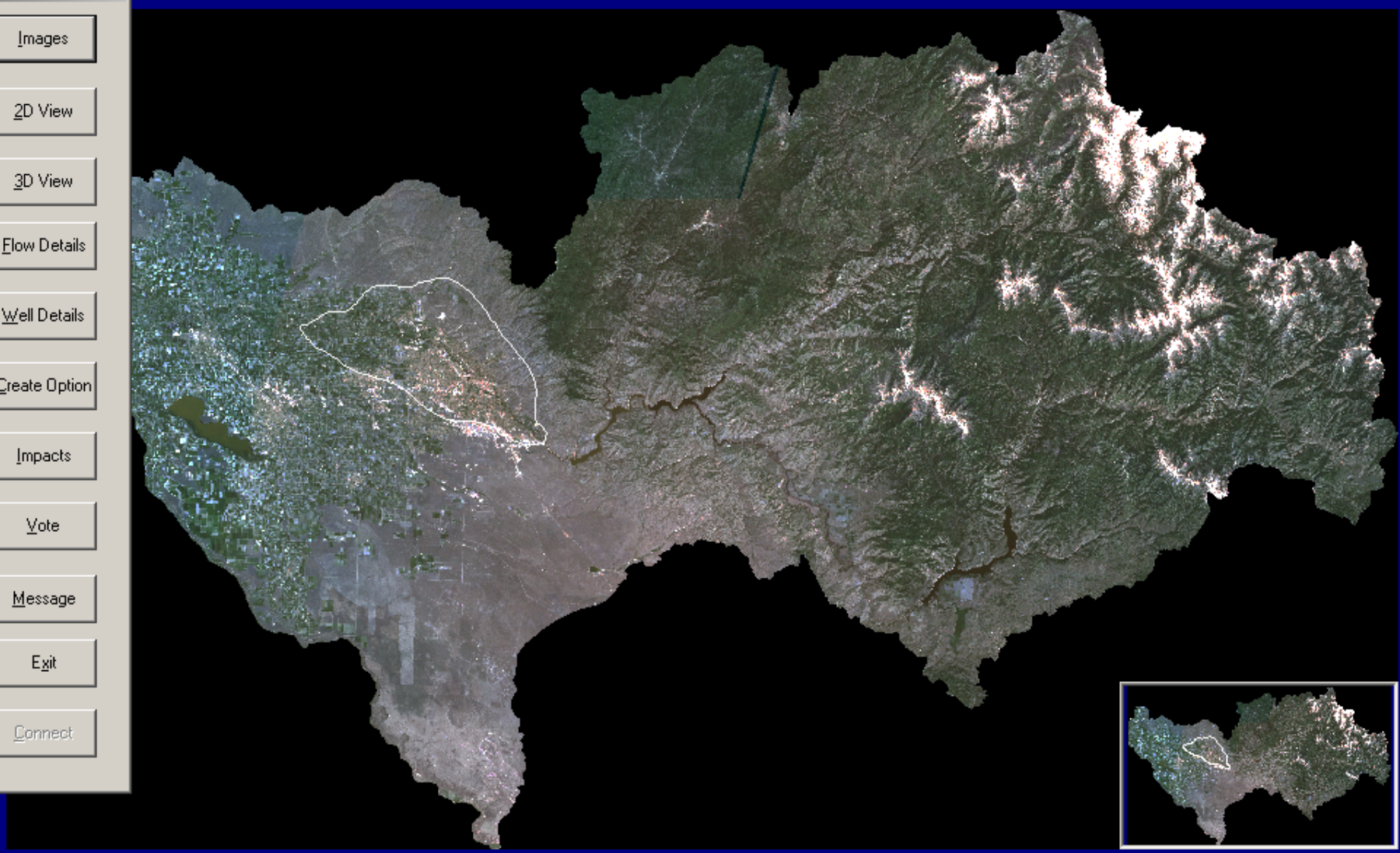

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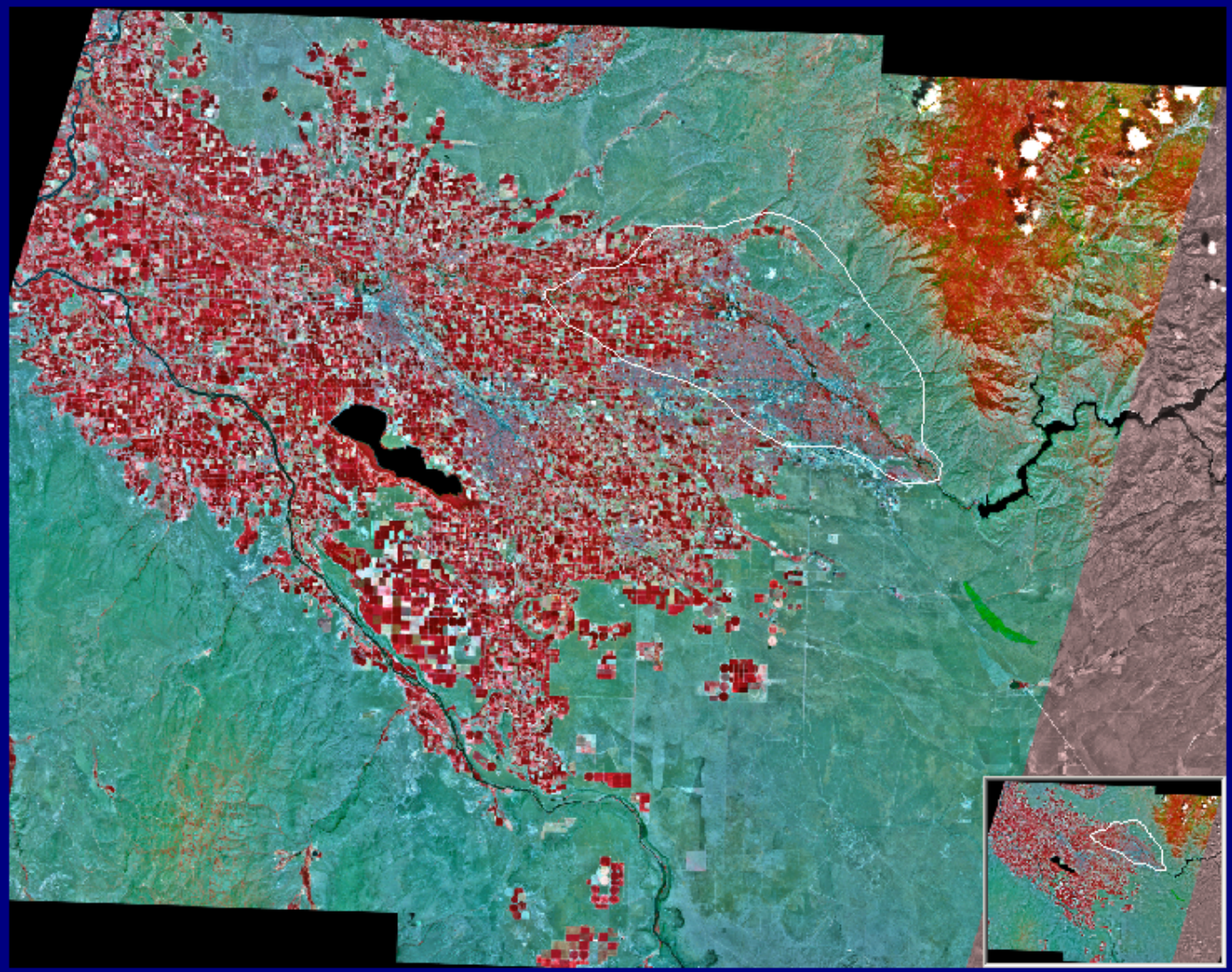

Treasure Valley Area - False Color Aerial Photo Mosaic
(5 meter resolution)

Basin Image | Basin Topo | Five Meter | One Meter

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Wells | Study Area

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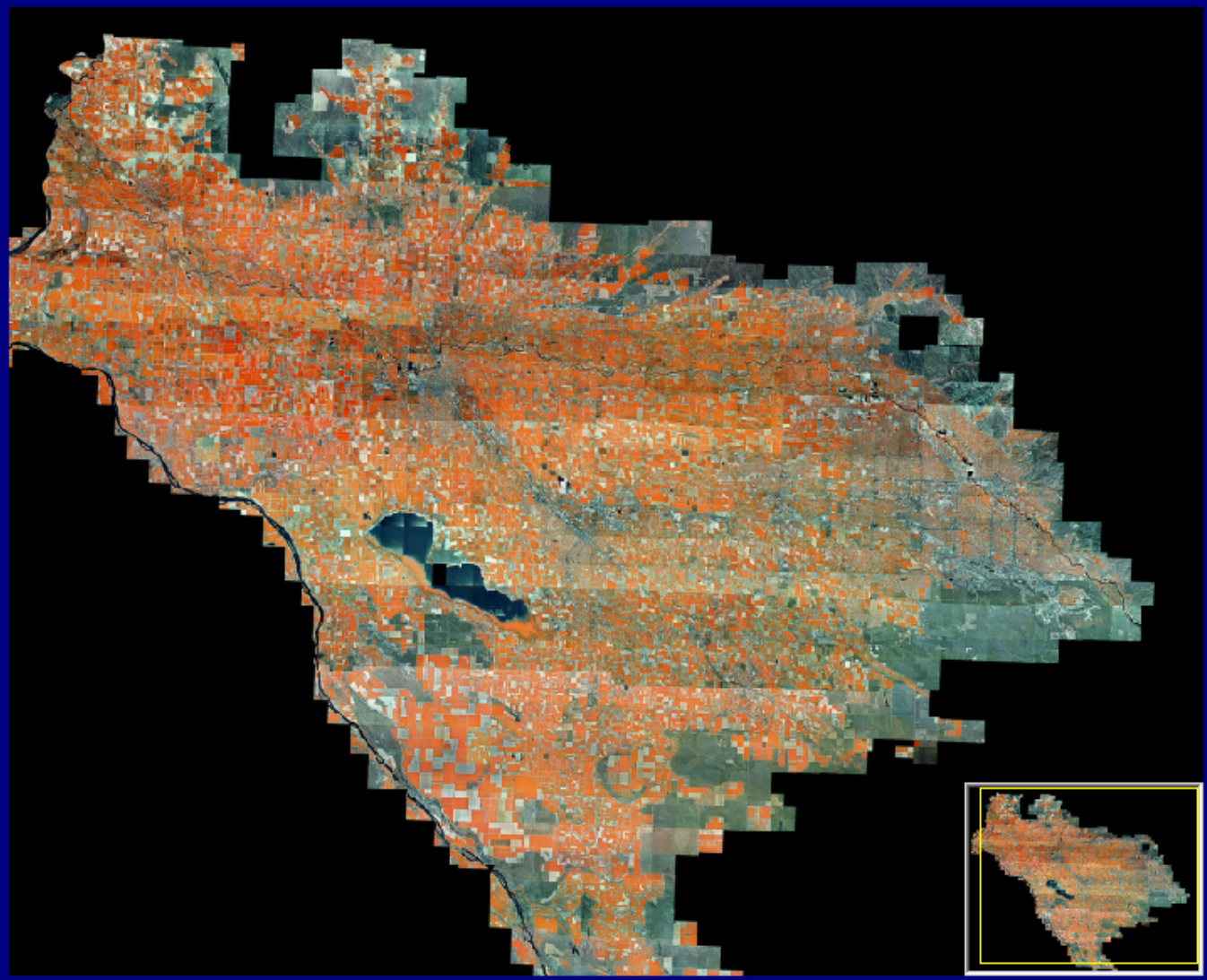

Treasure Valley Area - False Color Aerial Photo Mosaic
(1 meter resolution)

Basin Image | Basin Topo | Five Meter | One Meter

Close

Images

Zoom-In | Zoom-Out | Pan | Full

Wells | Study Area

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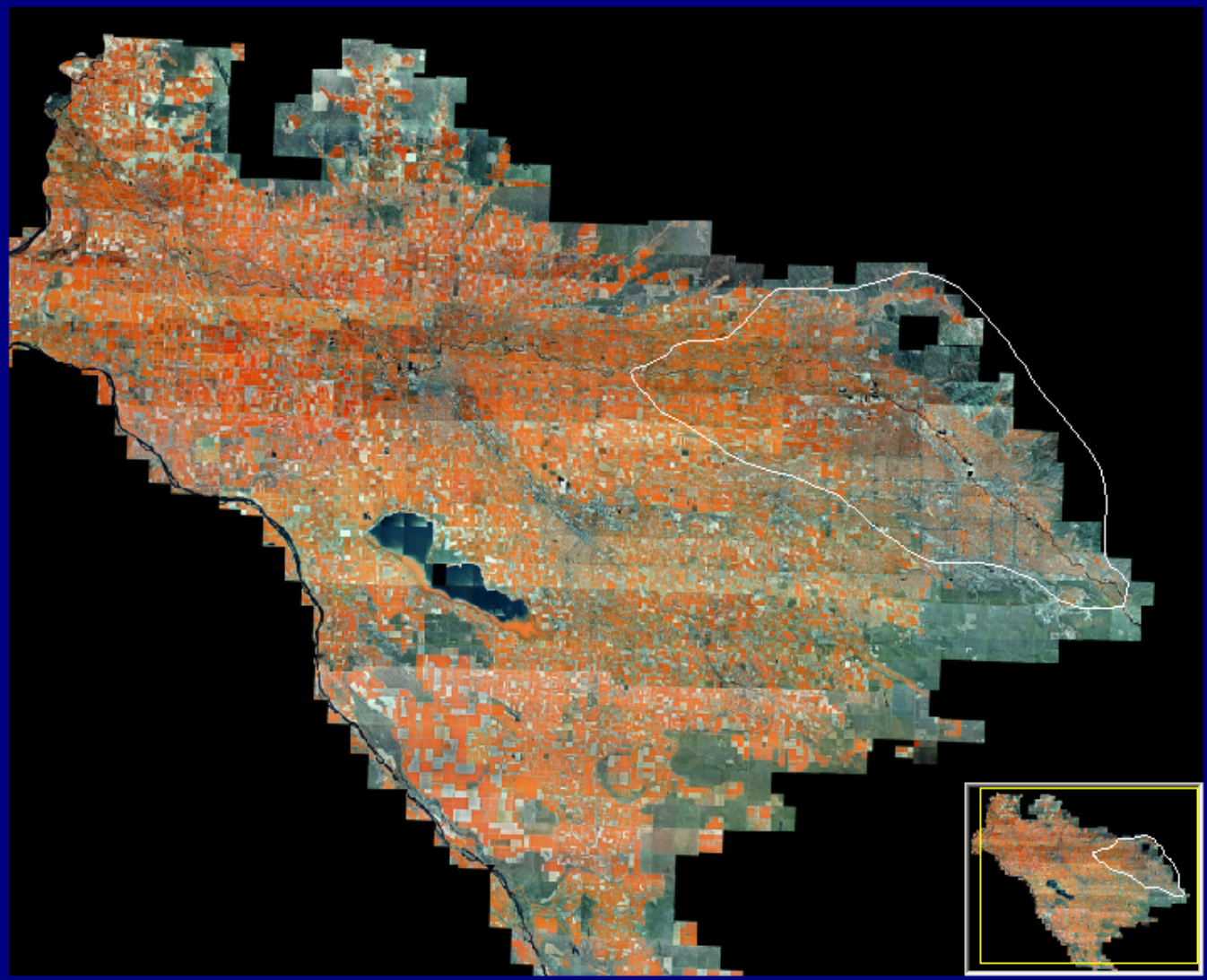

Treasure Valley Area - False Color Aerial Photo Mosaic
(1 meter resolution)

Basin Image | Basin Topo | Five Meter | One Meter

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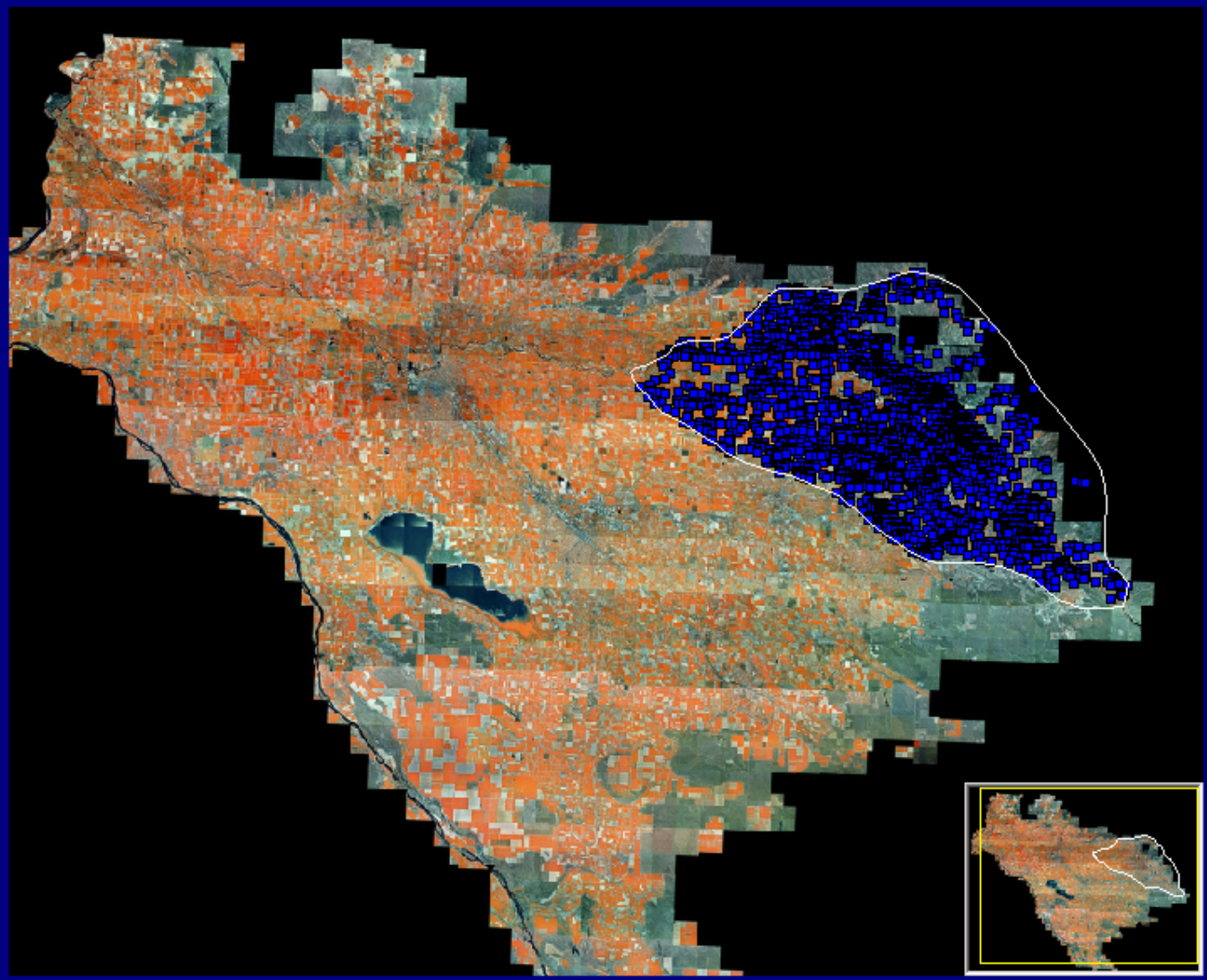

Treasure Valley Area - False Color Aerial Photo Mosaic
(1 meter resolution)

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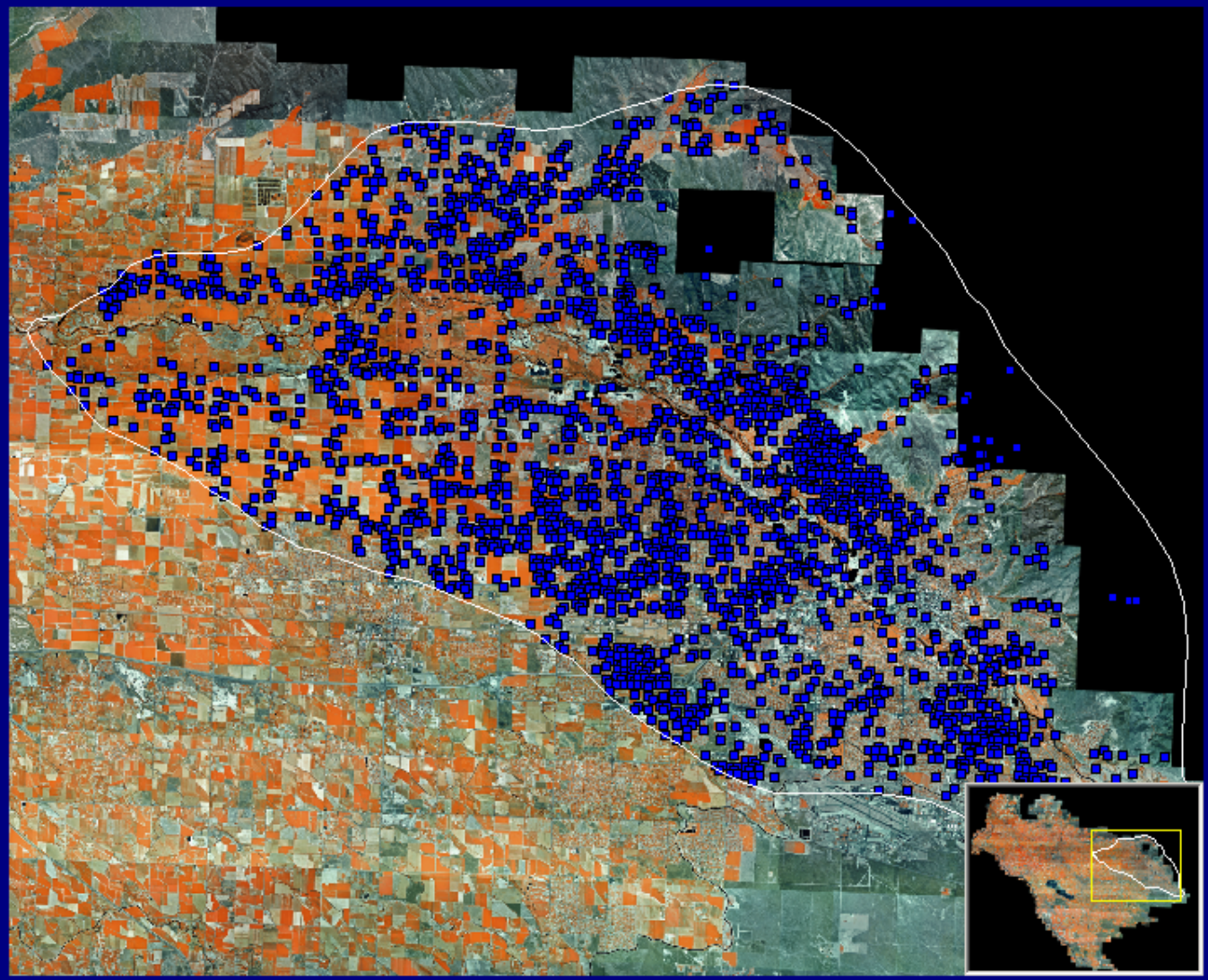

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(1 meter resolution)

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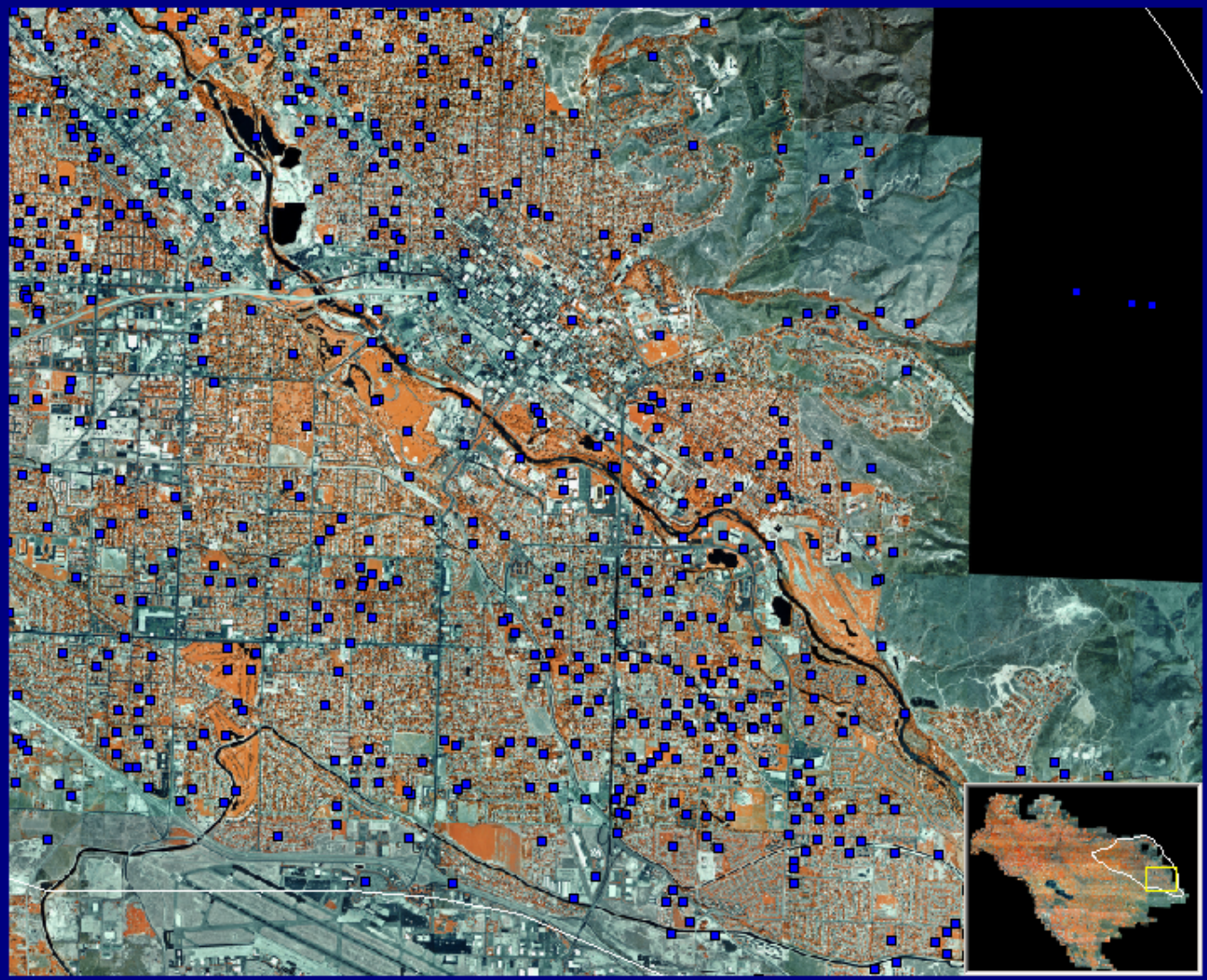

Treasure Valley Area - False Color Aerial Photo Mosaic
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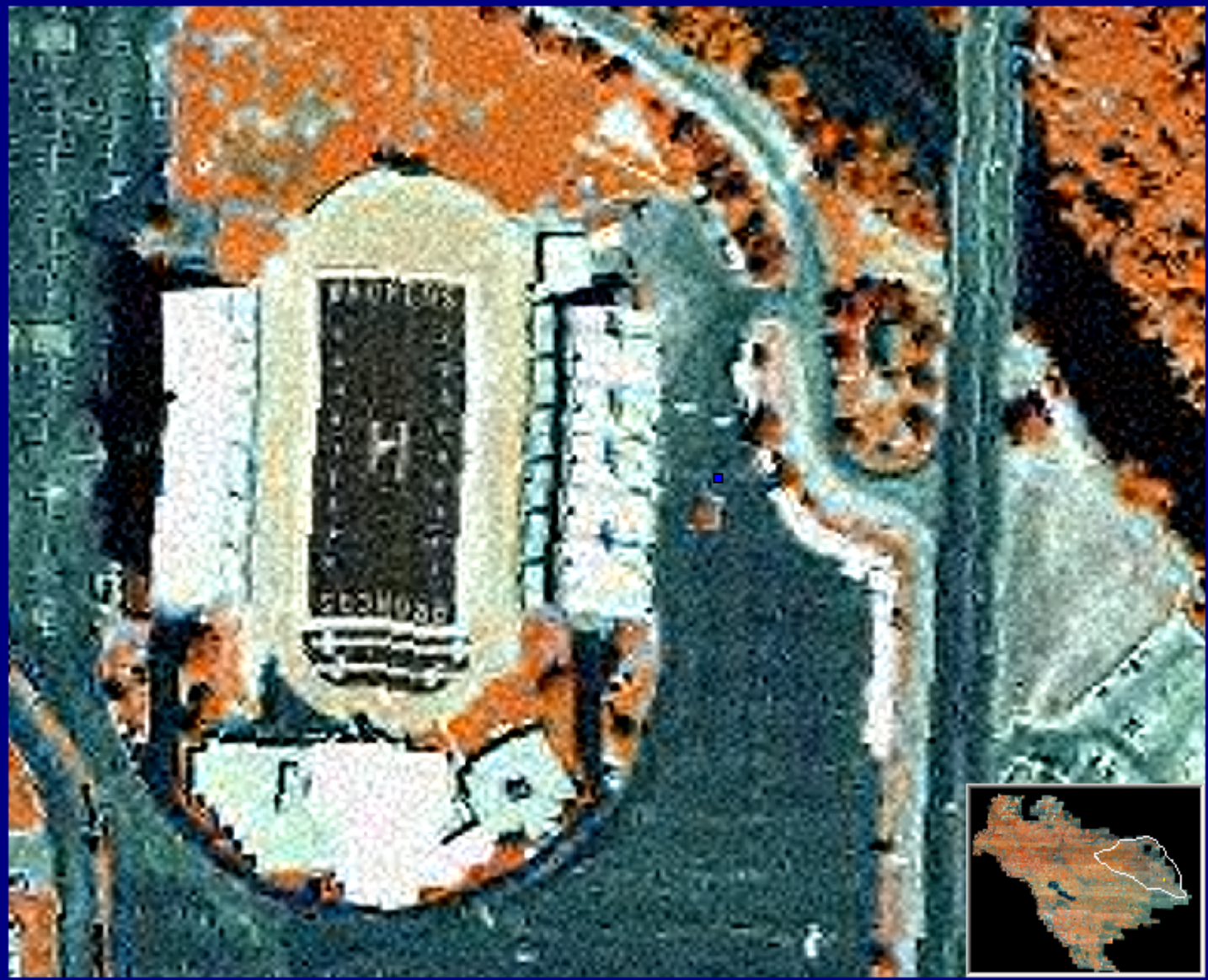

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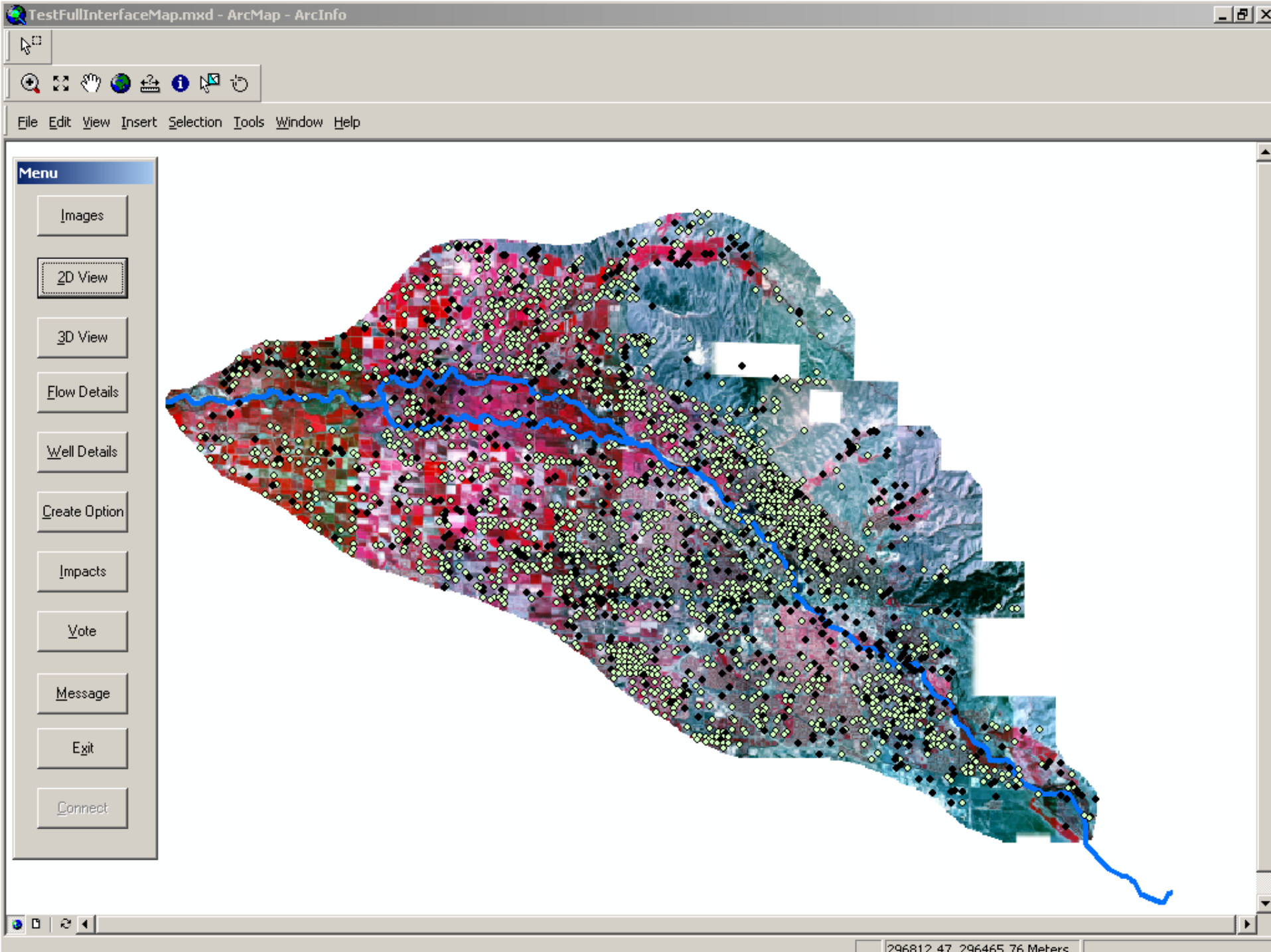
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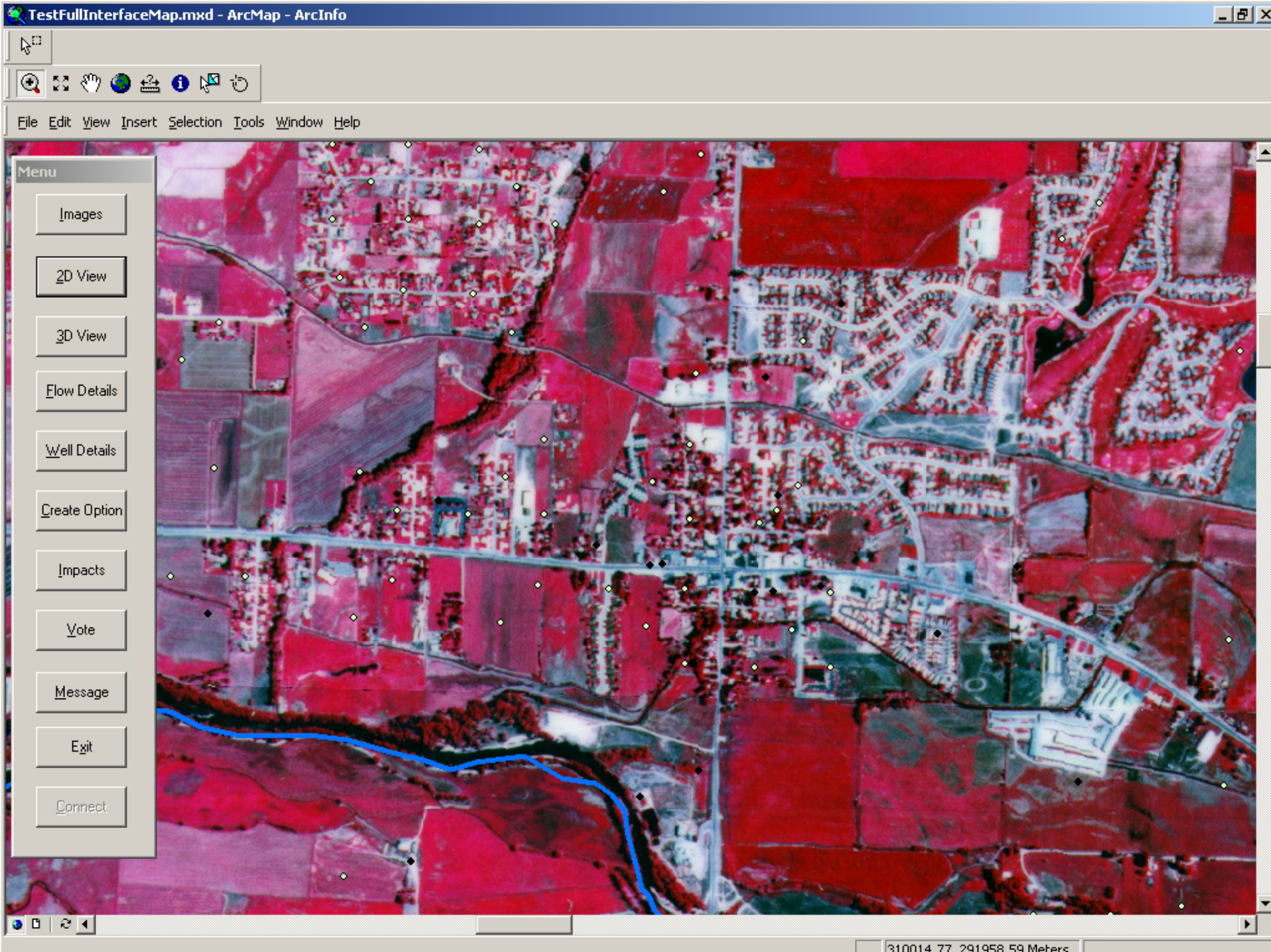
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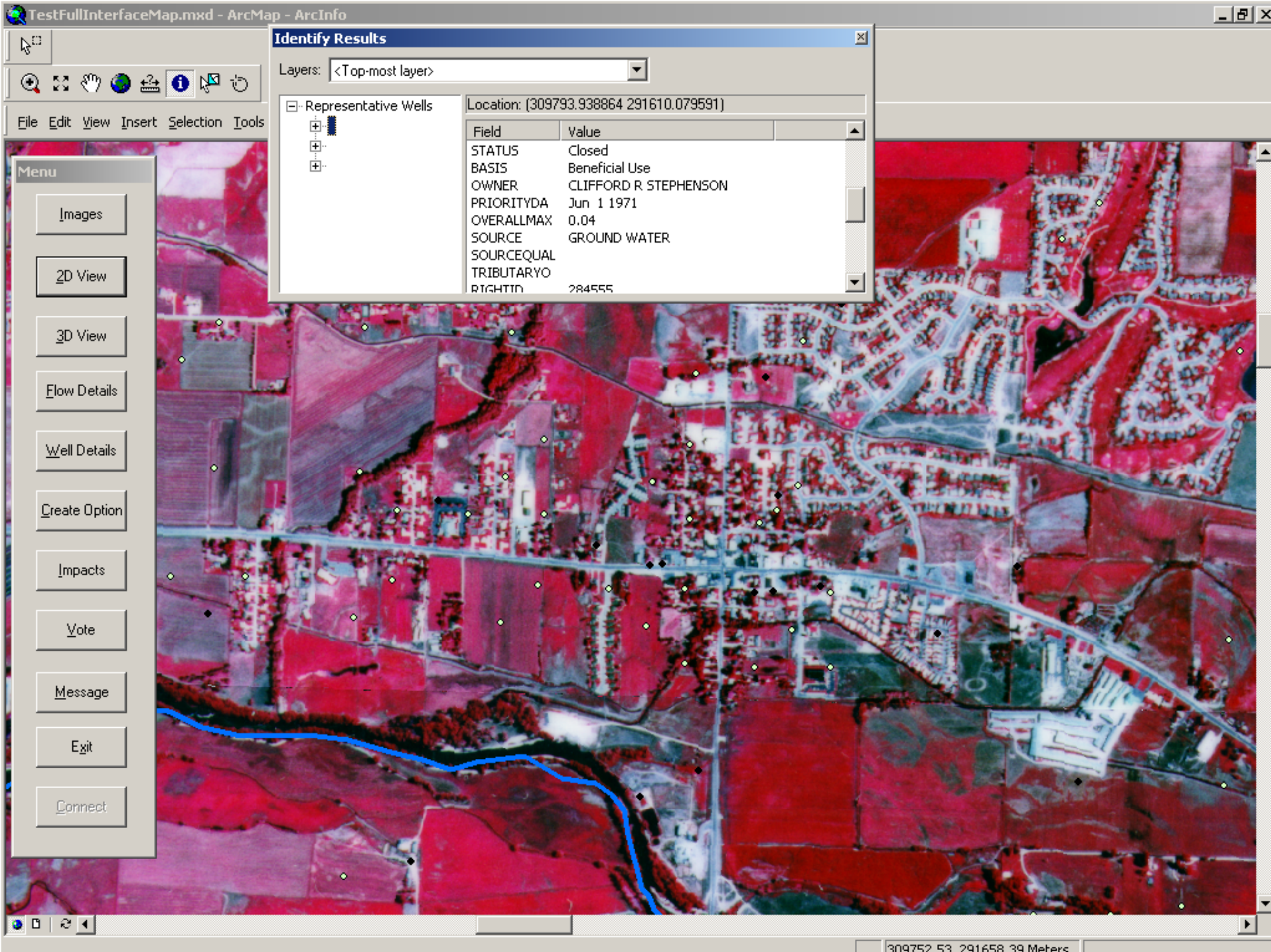
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STATUS Closed
BASIS Beneficial Use
OWNER CLIFFORD R STEPHENSON
PRIORITYDA Jun 1 1971
OVERALLMAX 0.04
SOURCE GROUND WATER
SOURCEQUAL
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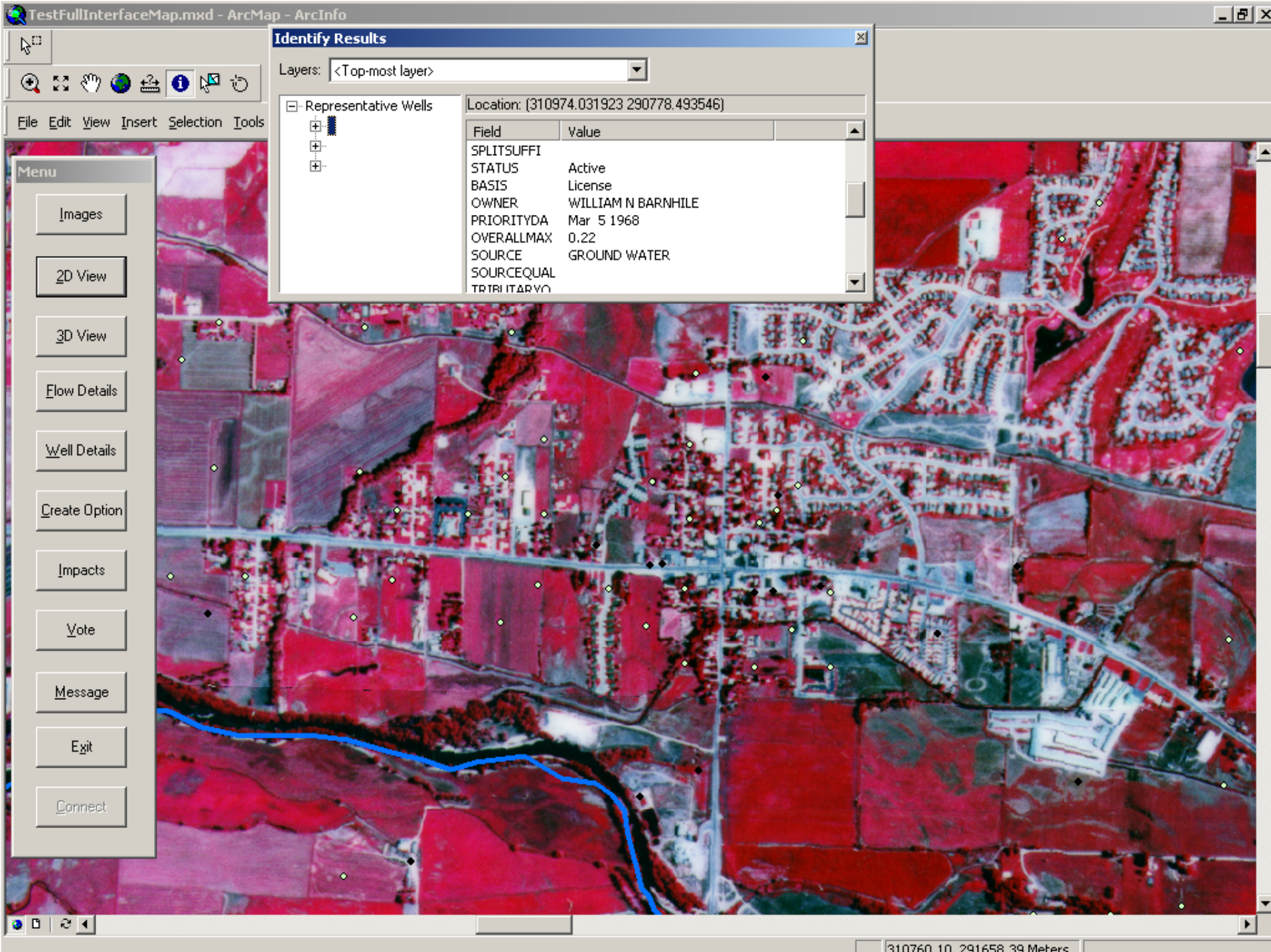
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Identify Results
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Representative Wells
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STATUS Active
BASIS License
OWNER WILLIAM N BARNHILE
PRIORITYDA Mar 5 1968
OVERALLMAX 0.22
SOURCE GROUND WATER
SOURCEQUAL
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TestFullInterfaceScene.sxd - ArcScene - ArcInfo

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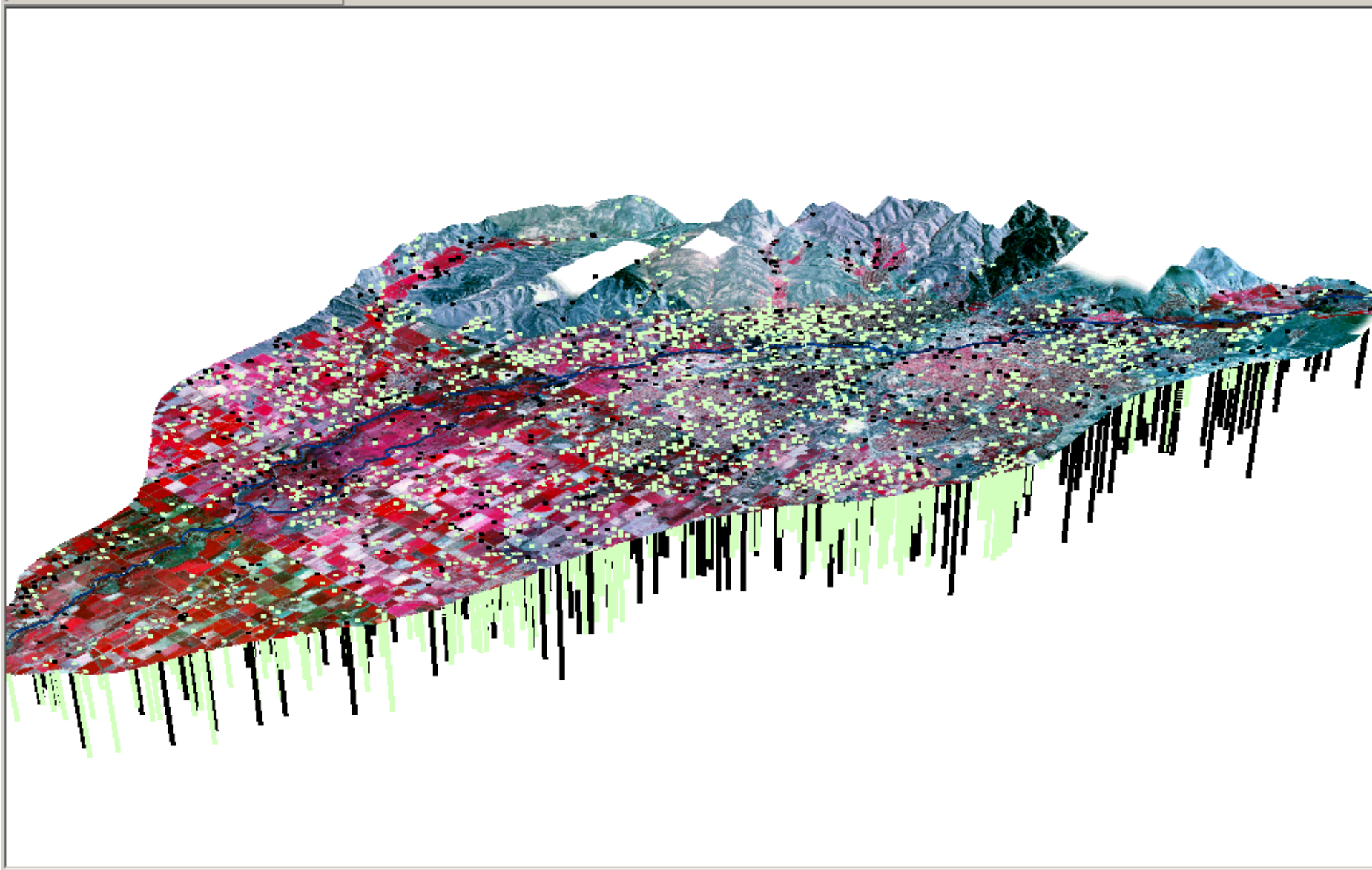

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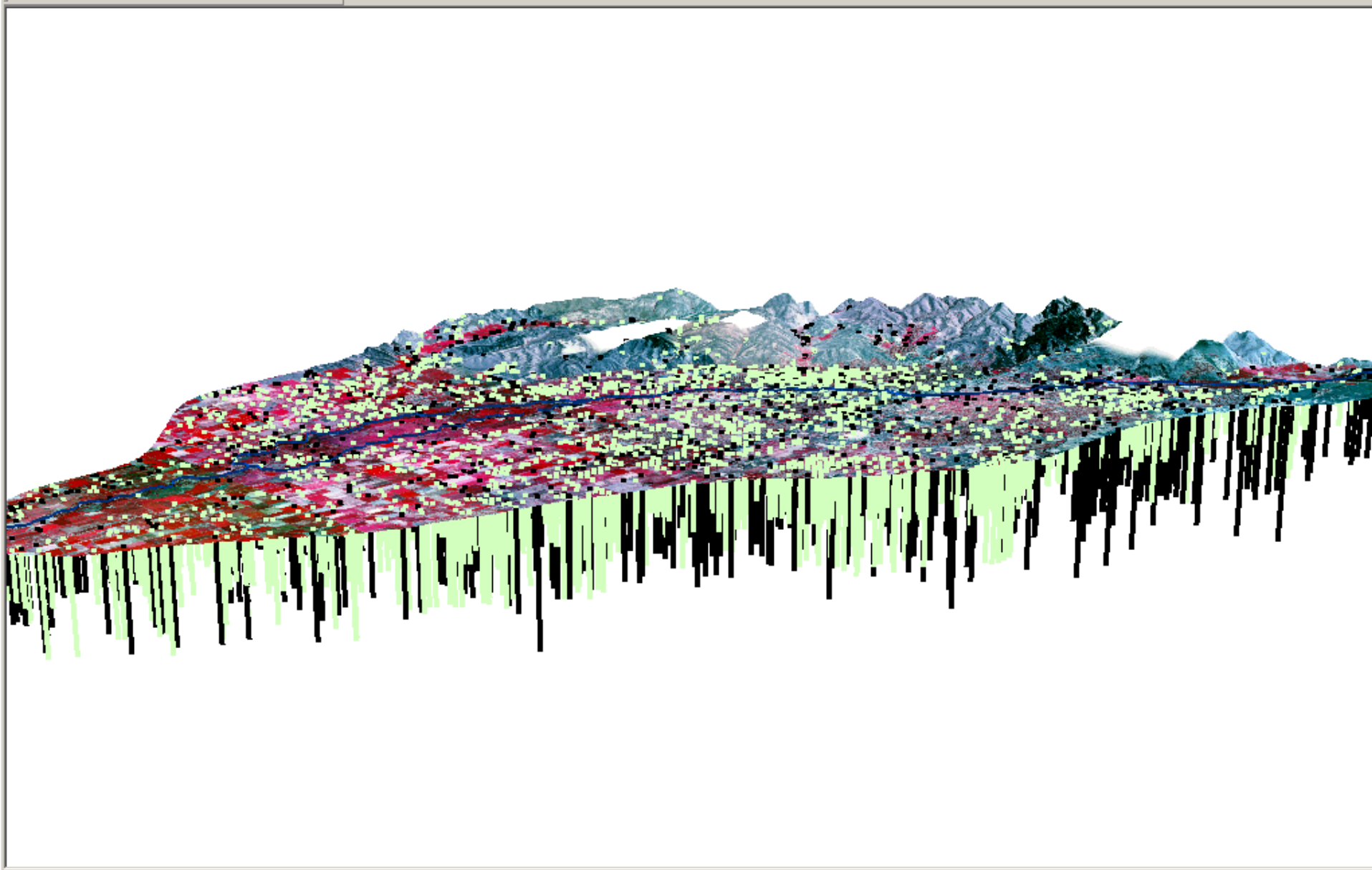

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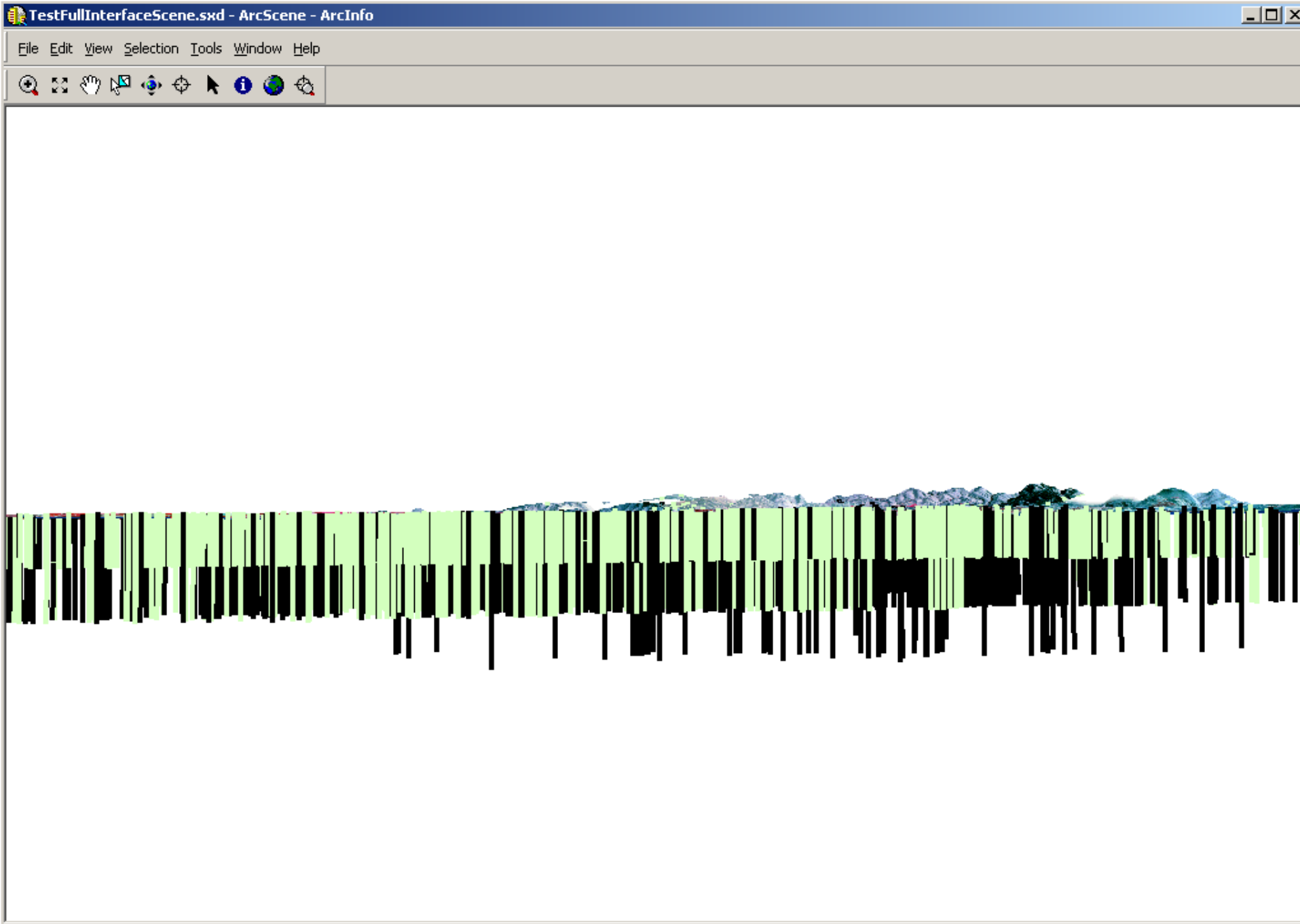
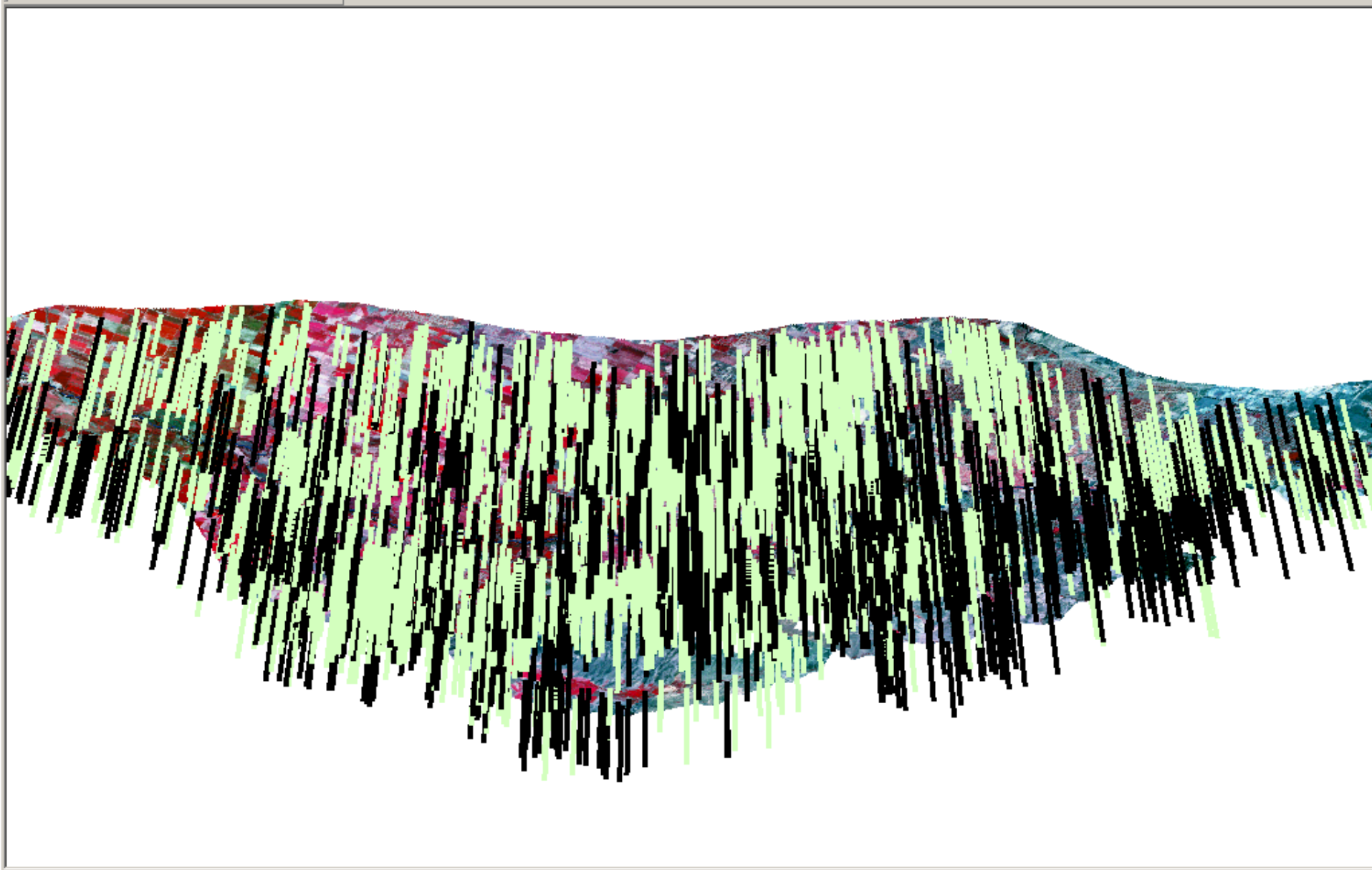
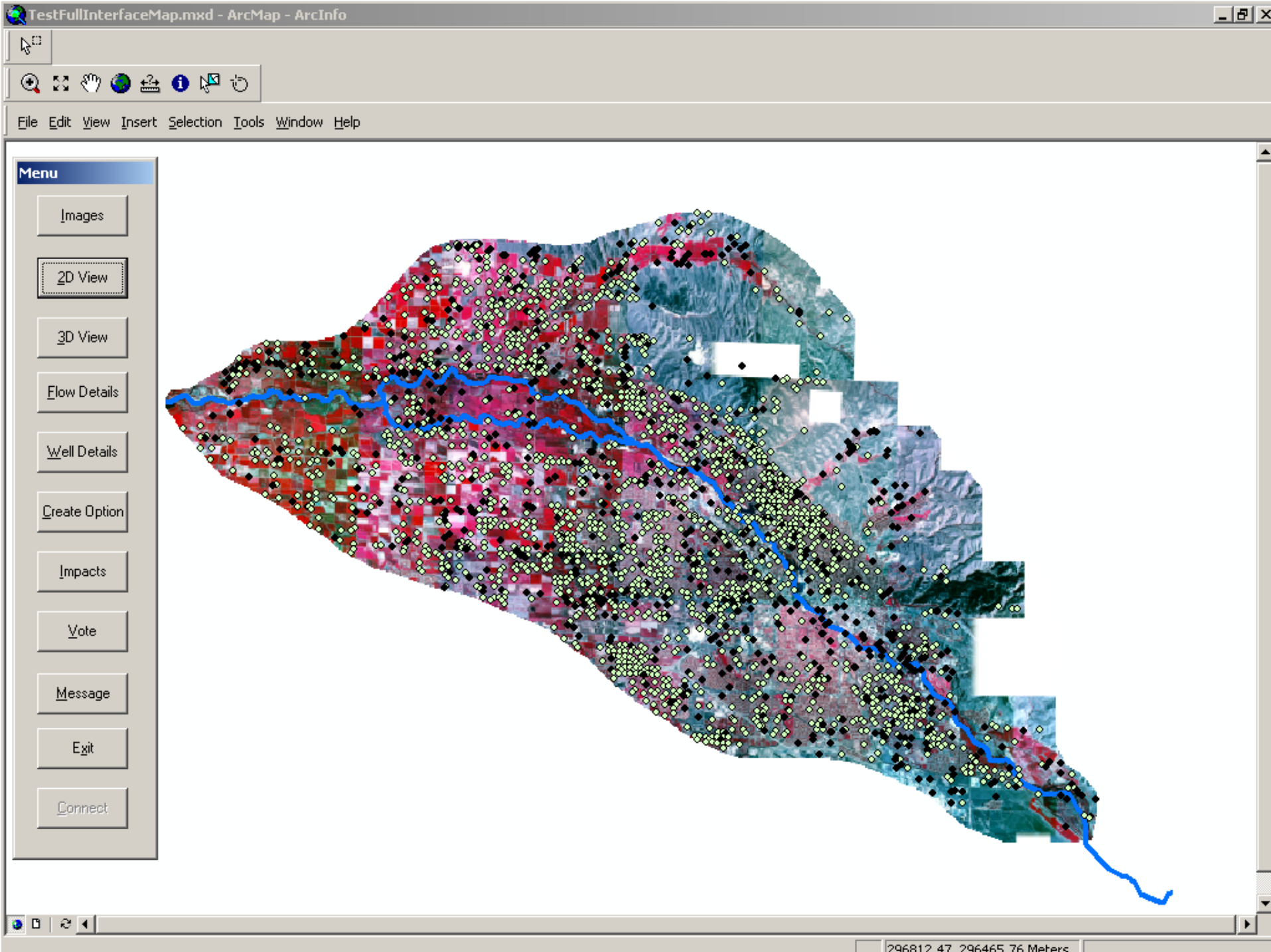
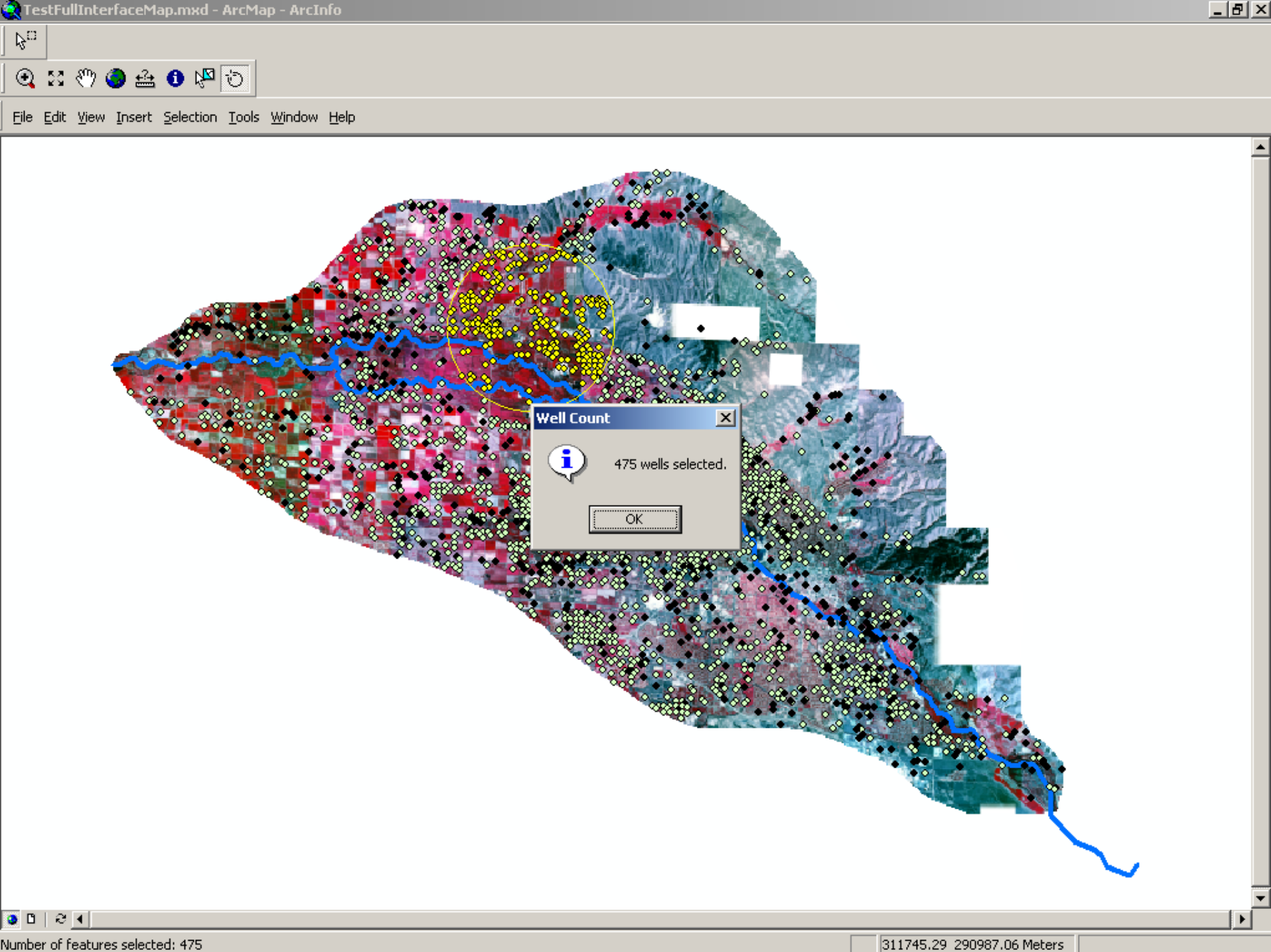


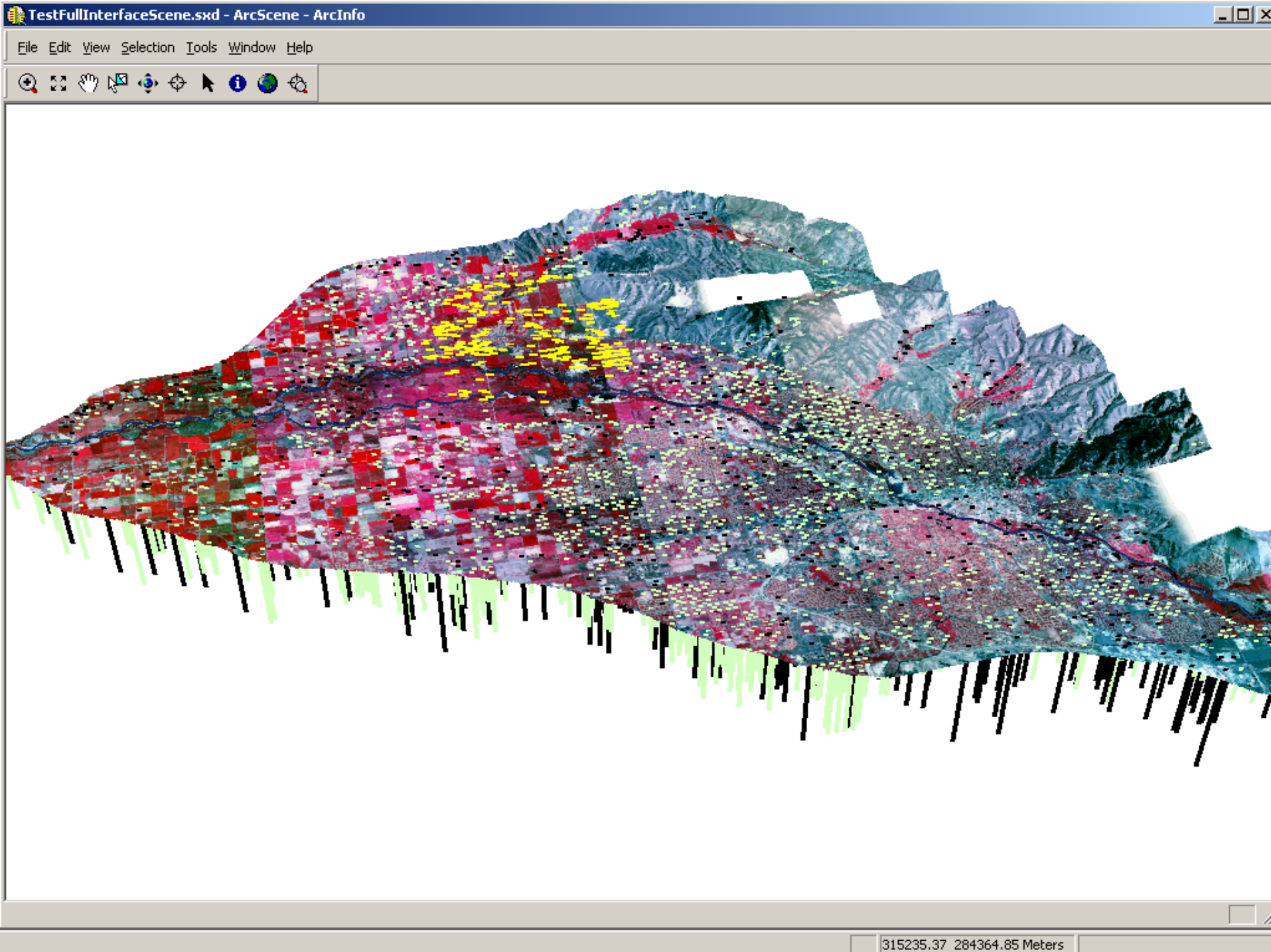
TestFullInterfaceScene.sxd - ArcScene - ArcInfo

File Edit View Selection Tools Window Help



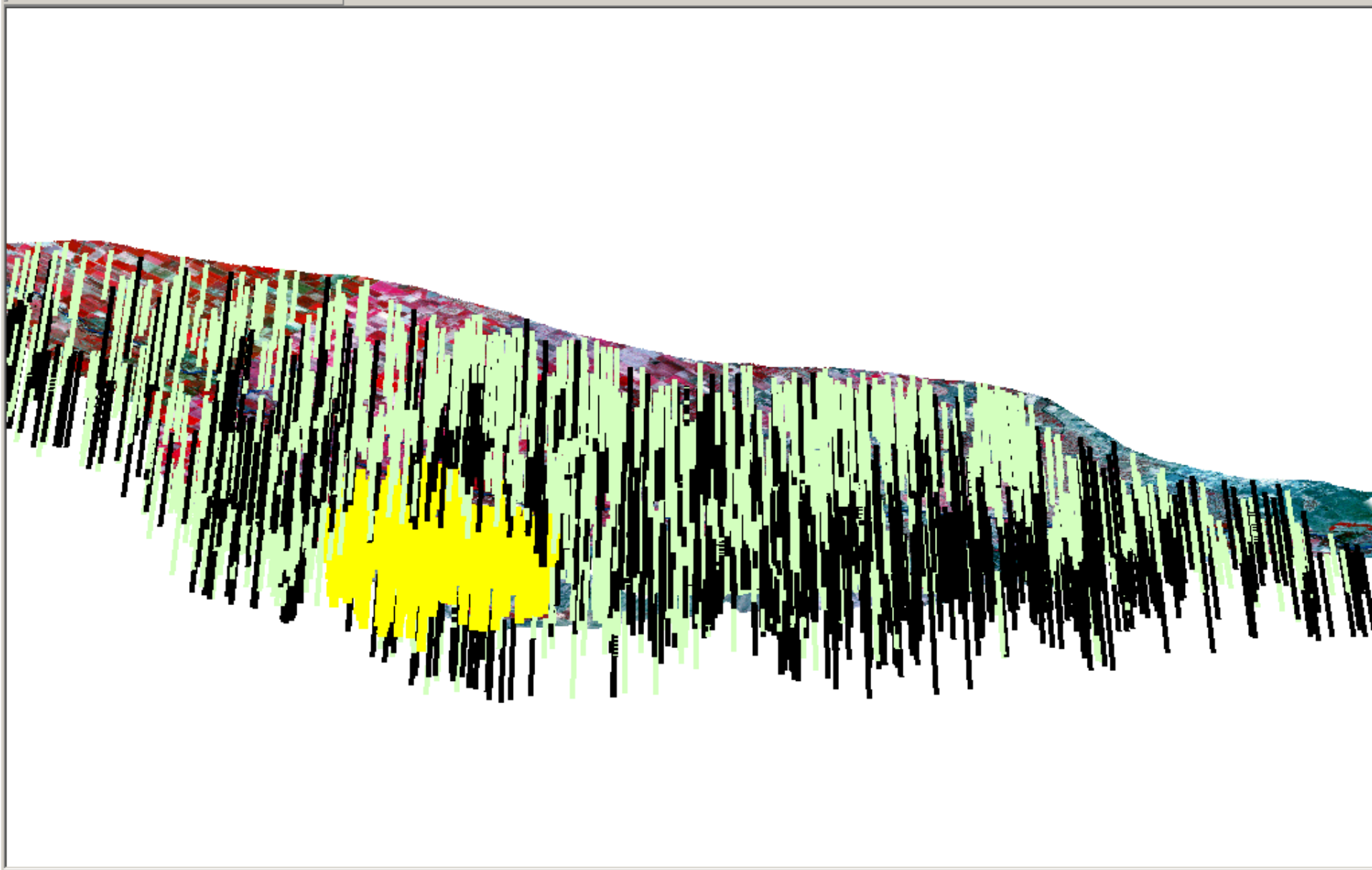

TestFullInterfaceMap.mxd - ArcMap - ArcInfo
File Edit View Insert Selection Tools Window Help
Menu
Images
2D View
3D View
Flow Details
Well Details
Create Option
Impacts
Vote
Message
Exit
Connect
296812.47 296465.76 Meters


TestFullInterfaceMap.mxd - ArcMap - ArcInfo
File Edit View Insert Selection Tools Window Help
Well Count
475 wells selected.
OK
Number of features selected: 475
311745.29 290987.06 Meters


TestFullInterfaceScene.sxd - ArcScene - ArcInfo
File Edit View Selection Tools Window Help
315235.37 284364.85 Meters

TestFullInterfaceScene.sxd - ArcScene - ArcInfo

File Edit View Selection Tools Window Help



Water Group Prototype

Water Group Prototype

Menu

Images

2D View

3D View

Flow Details

Well Details

Create Option

Impacts

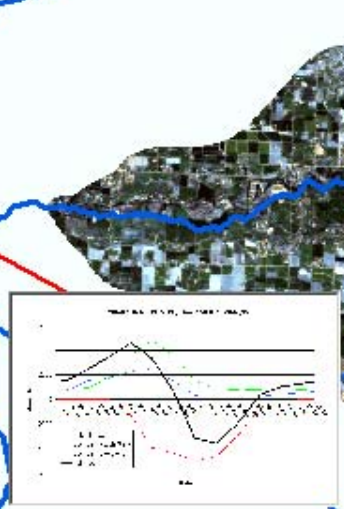
Vote

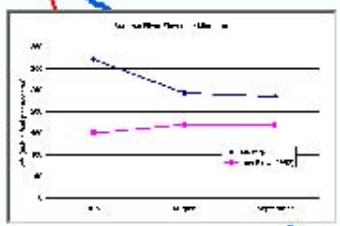
Message

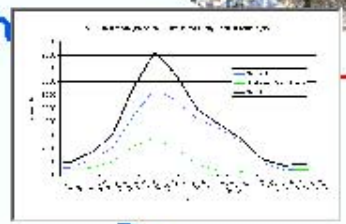
Exit

Connect

Flows in River - Click on a chart to view full size

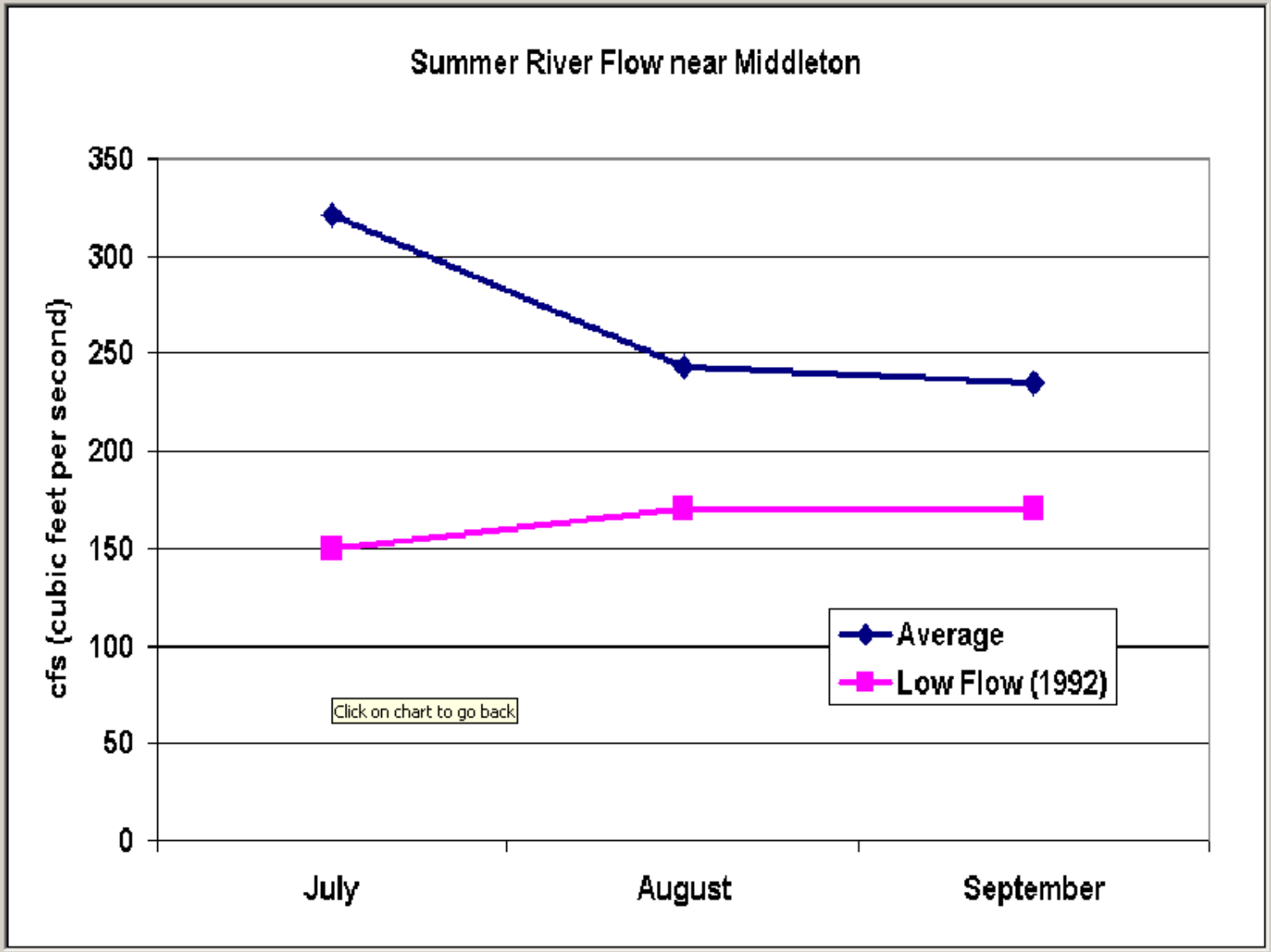






Close

Representative well breakdown - Click chart to go back



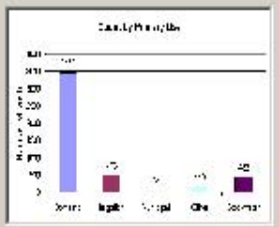
Close

Water Group Prototype

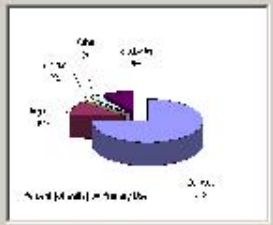
Menu

- Images
- 2D View
- 3D View
- Flow Details
- Well Details
- Create Option
- Impacts
- Vote
- Message
- Exit
- Connect

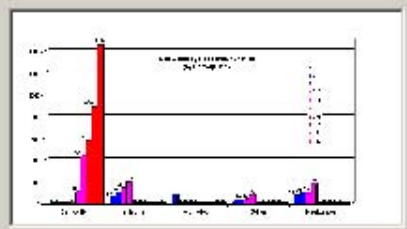
Well Breakdowns - Click on a Chart to View



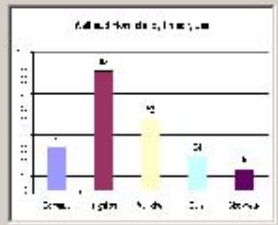
Well Count by Primary Use



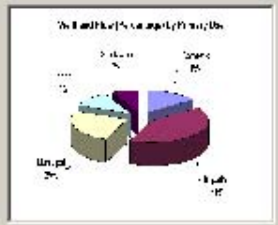
Well Count (Percentage of Total) by Primary Use



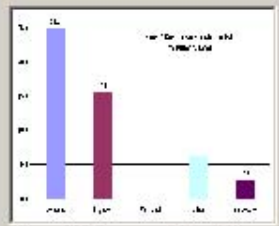
Well Count by Response Function (by Primary Use)



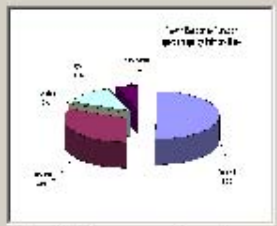
Flow Rate by Primary Use



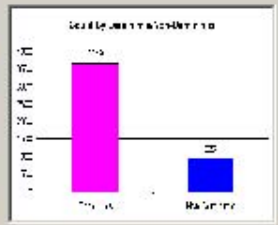
Flow Rate (Percentage of Total) by Primary Use



Flow * Response Function (by Primary Use)

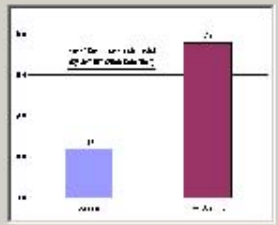


Flow * Response Function (Percentage by Primary Use)

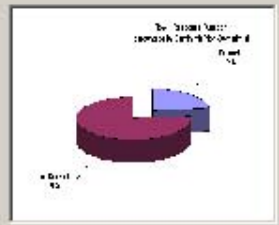


Well Count by Deminimis/Non-Deminimis

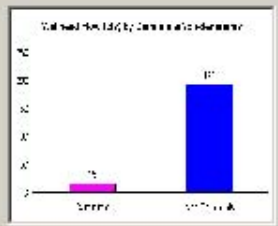
Well Count (Percentage) by Deminimis/Non-Deminimis



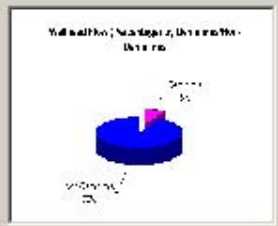
Flow * Response Function (by Deminimis/Non-Deminimis)



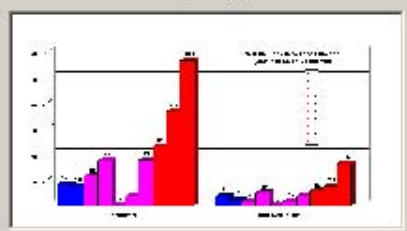
Flow * Response Function (%, Deminimis/Non-Deminimis)



Flow Rate by Deminimis/Non-Deminimis



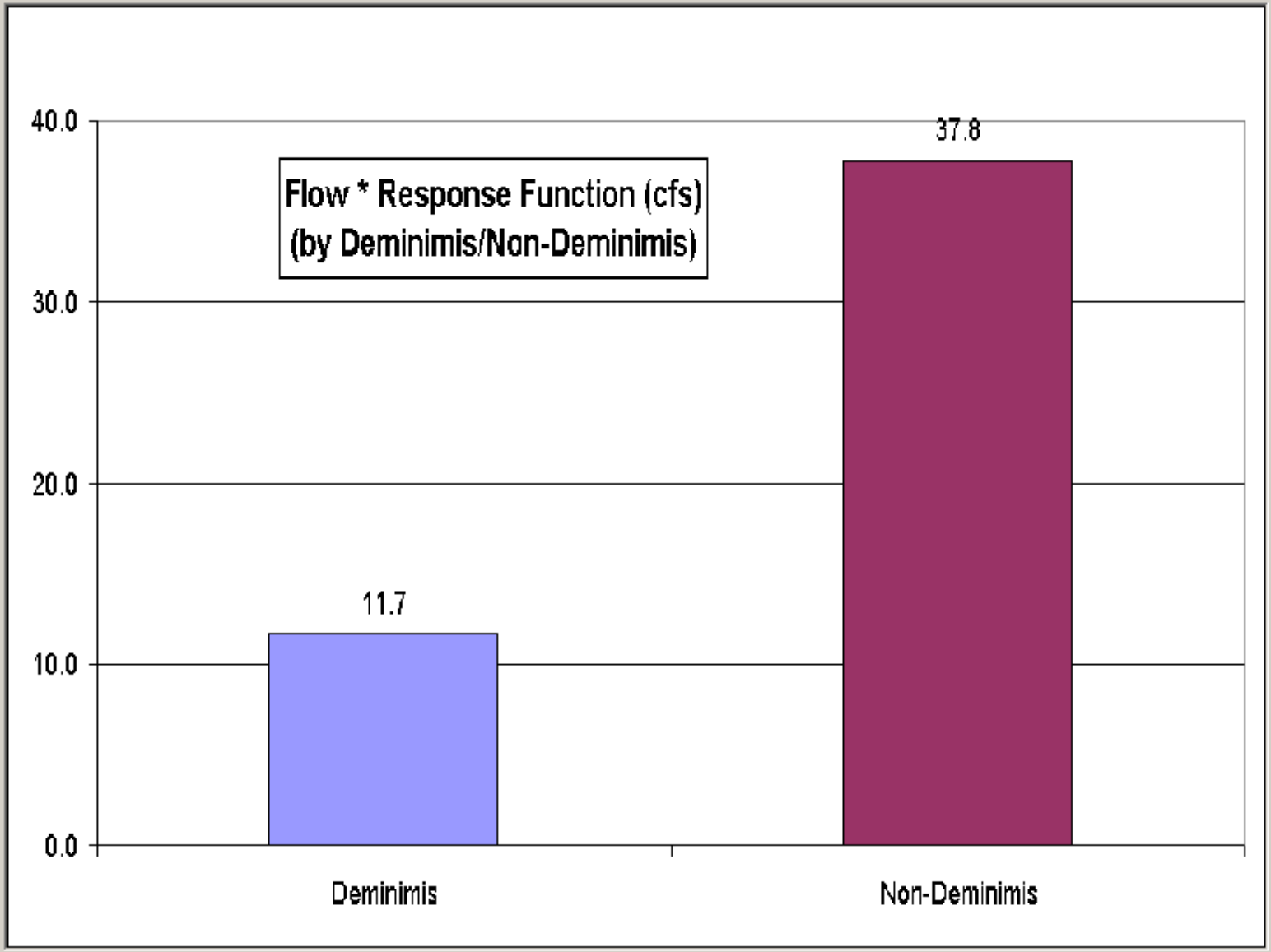
Flow Rate (Percentage) by Deminimis/Non-Deminimis



Well Count by Response Function (by Deminimis/Non-Deminimis)

Close

Representative well breakdown - Click chart to go back



Close

Water Group Prototype

Menu

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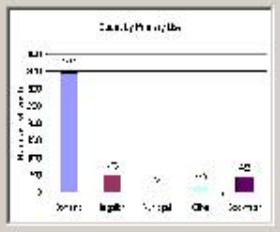
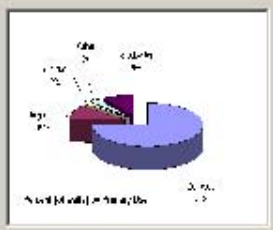
- 2D View
- 3D View
- Flow Details
- Well Details
- Define Option
- Impacts
- Vote
- Message
- Exit
- Connect

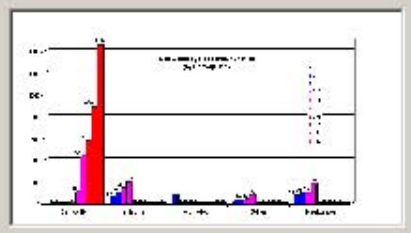
Well Breakdowns - Click on a Chart to View



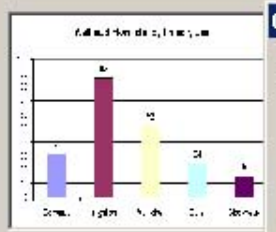
Well Count by Primary Use



Well Count (Percentage of Total) by Primary Use



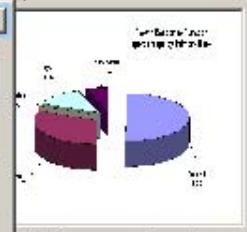
Well Count by Response Function (by Primary Use)



Flow Rate by Primary Use

Total) by Primary Use

(by Primary Use)



Response Function (Percentage by Primary Use)

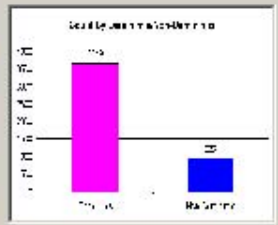
Option Name

Enter a Descriptive Name for this Option

OK

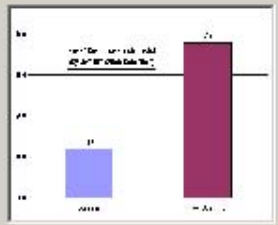
Cancel

Large Wells First

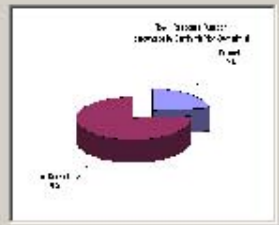


Well Count by Deminimis/Non-Deminimis

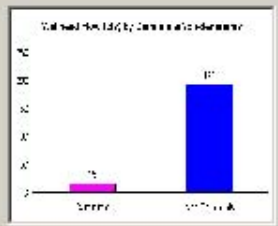
Well Count (Percentage) by Deminimis/Non-Deminimis



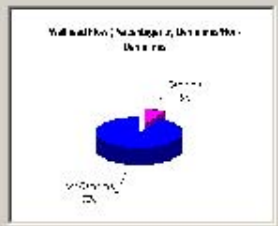
Flow * Response Function (by Deminimis/Non-Deminimis)



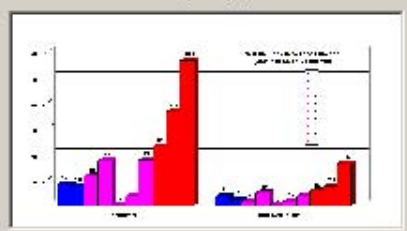
Flow * Response Function (%, Deminimis/Non-Deminimis)



Flow Rate by Deminimis/Non-Deminimis

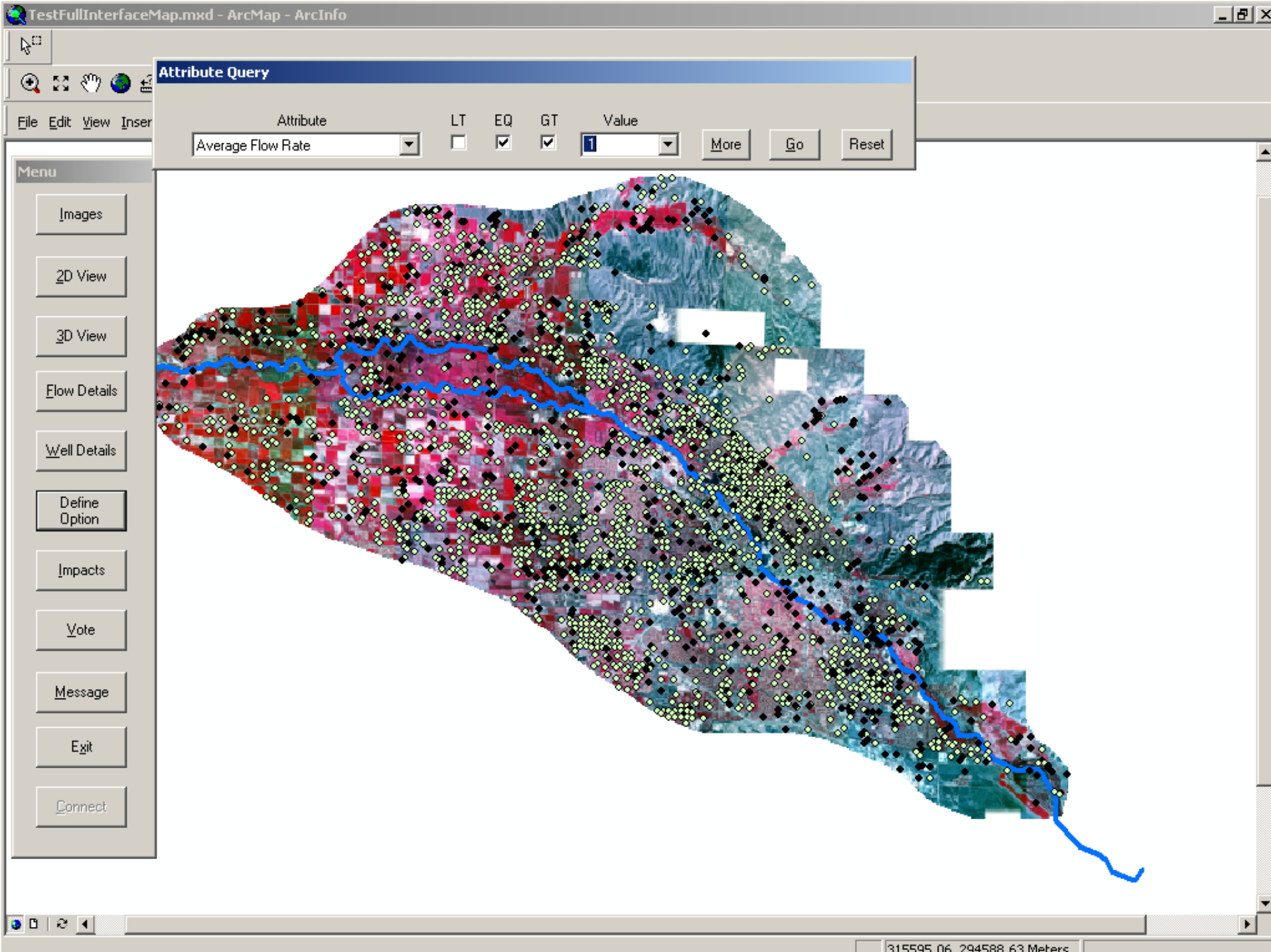


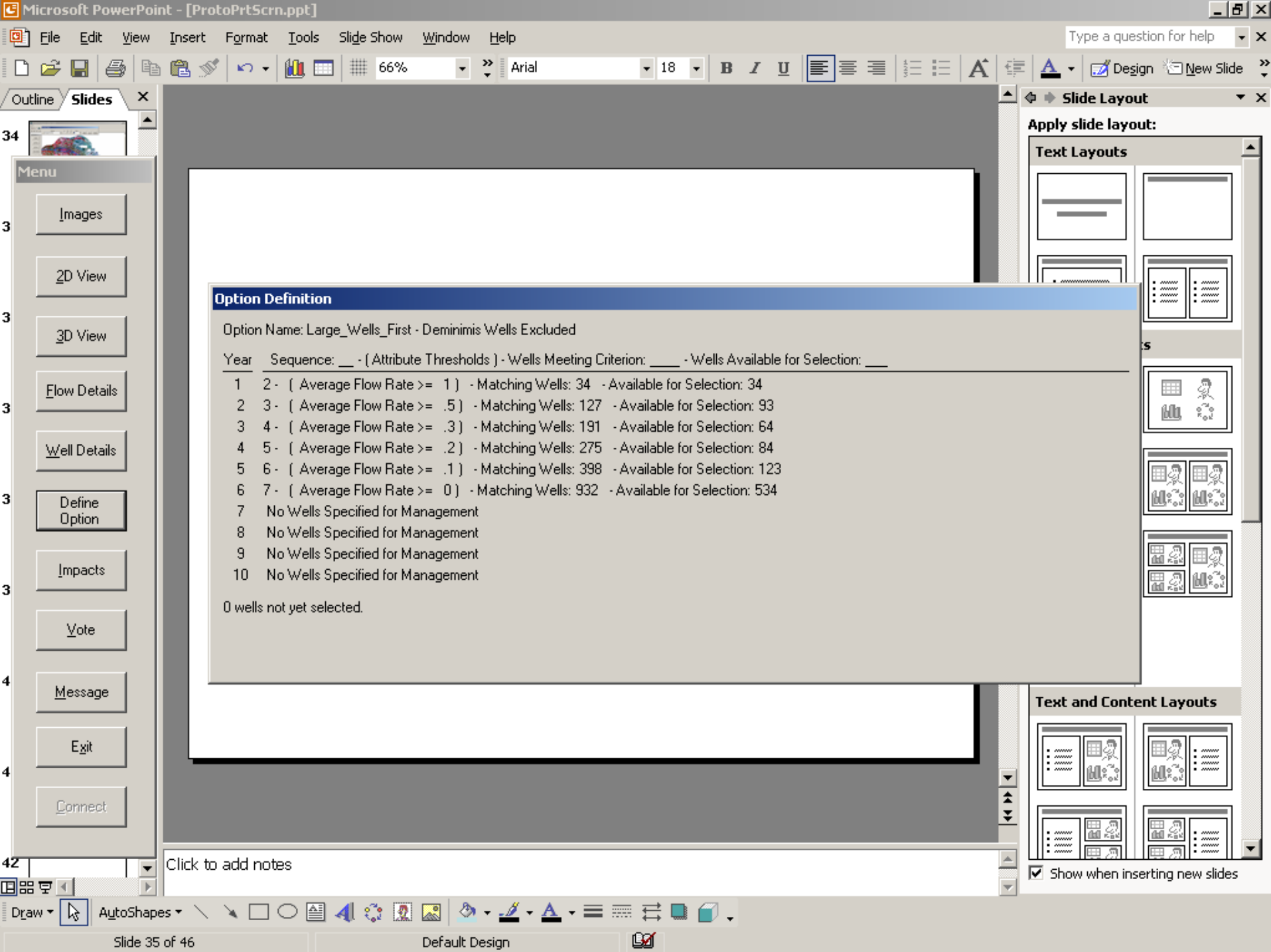
Flow Rate (Percentage) by Deminimis/Non-Deminimis



Well Count by Response Function (by Deminimis/Non-Deminimis)

Close


TestFullInterfaceMap.mxd - ArcMap - ArcInfo
Attribute Query
Attribute
Average Flow Rate
LT
EQ
GT
Value
1
More
Go
Reset
File
Edit
View
Inser
Menu
Images
2D View
3D View
Flow Details
Well Details
Define Option
Impacts
Vote
Message
Exit
Connect
315595.06 294588.63 Meters


Microsoft PowerPoint - [ProtoPrtScrn.ppt]
File Edit View Insert Format Tools Slide Show Window Help
Type a question for help
Design New Slide
Outline Slides
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3D View
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Vote
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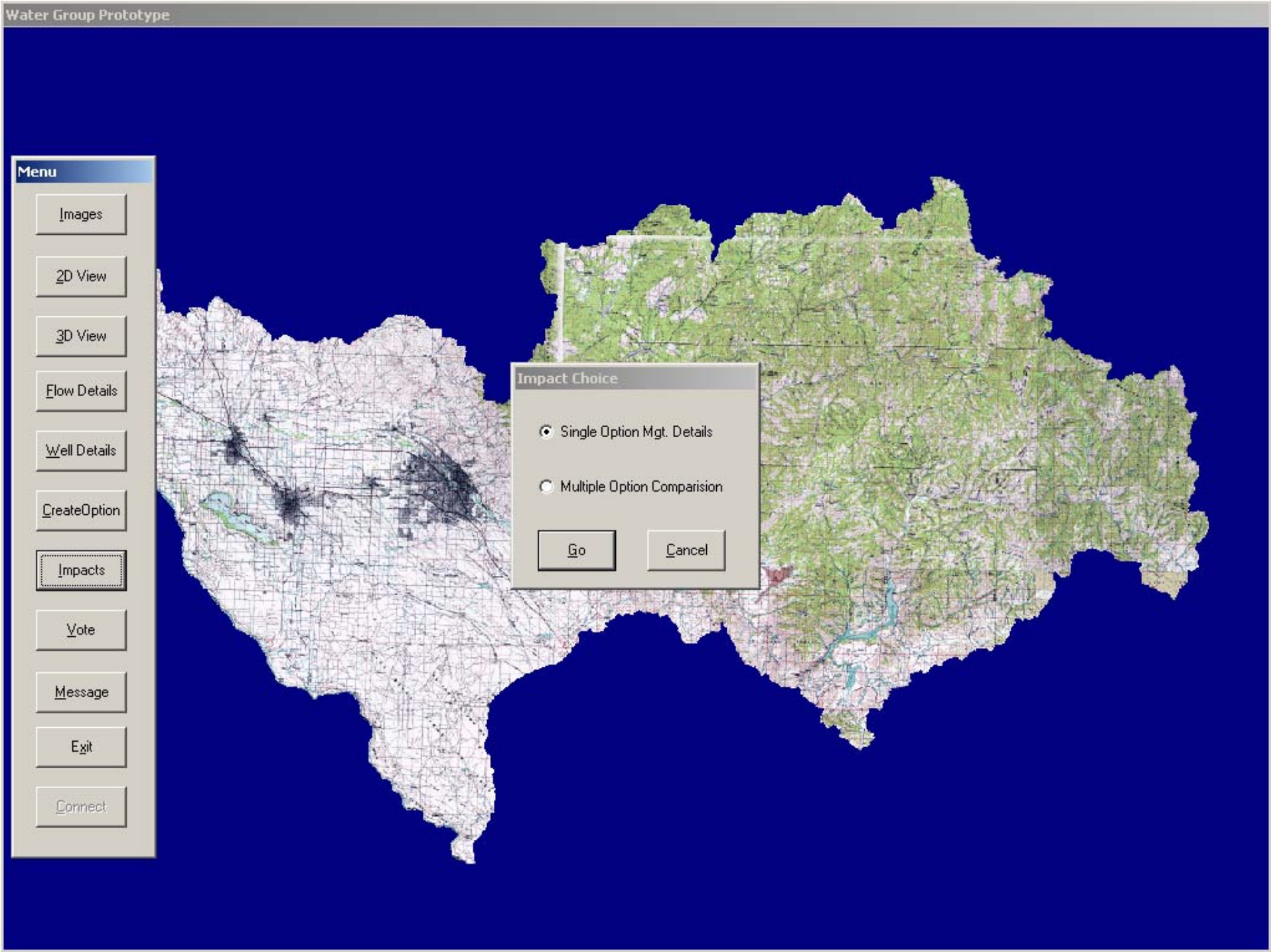
Exit
Connect
Option Definition
Option Name: Large_Wells_First - Deminimis Wells Excluded
Year Sequence: __ - (Attribute Thresholds) - Wells Meeting Criterion: ____ - Wells Available for Selection: ___
1 2 - (Average Flow Rate >= 1) - Matching Wells: 34 - Available for Selection: 34
2 3 - (Average Flow Rate >= .5) - Matching Wells: 127 - Available for Selection: 93
3 4 - (Average Flow Rate >= .3) - Matching Wells: 191 - Available for Selection: 64
4 5 - (Average Flow Rate >= .2) - Matching Wells: 275 - Available for Selection: 84
5 6 - (Average Flow Rate >= .1) - Matching Wells: 398 - Available for Selection: 123
6 7 - (Average Flow Rate >= 0) - Matching Wells: 932 - Available for Selection: 534
7 No Wells Specified for Management
8 No Wells Specified for Management
9 No Wells Specified for Management
10 No Wells Specified for Management
0 wells not yet selected.
Slide Layout
Apply slide layout:
Text Layouts
Text and Content Layouts
Show when inserting new slides
Click to add notes
Draw AutoShapes
Slide 35 of 46
Default Design


Water Group Prototype
Menu
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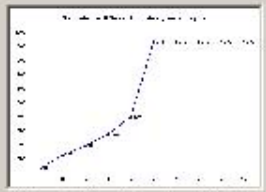
Flow Details
Well Details
CreateOption
Impacts
Vote
Message
Exit
Connect
Impact Choice
Single Option Mgt. Details
Multiple Option Comparision
Go
Cancel

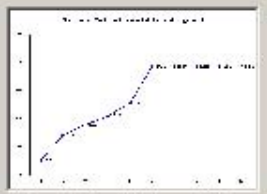
Water Group Prototype

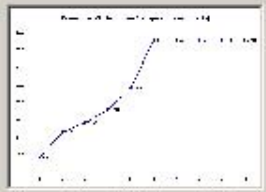
Option Charts - Click on a chart to view at full size

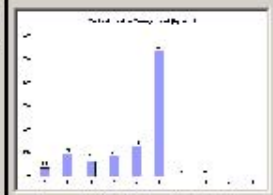
Option Name: Large_Wells_First - Exclude_DeMinimis

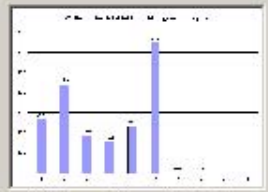
Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10

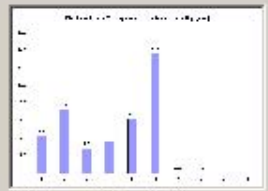

Cumulative Count of Wells Under Management


Cumulative Wellhead Flow of Wells Under Management

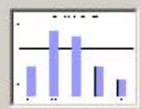

Cumulative (Wellhead Flow) * (Response Function)

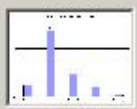

Count of Wells Added to Management (by year)

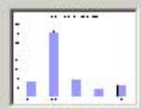

Wellhead Flow Added to Management (by year)

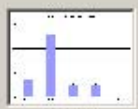

Wellhead Flow * Response Function (by year)

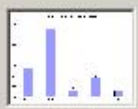
Wells Added to Management (by Primary Use)

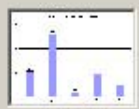

Year 1 (2005)

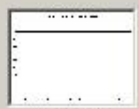

Year 2 (2006)


Year 3 (2007)


Year 4 (2008)


Year 5 (2009)

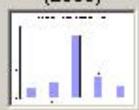

Year 6 (2010)

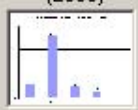

Year 7 (2011)

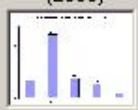

Year 8 (2012)


Year 9 (2013)


Year 10 (2014)



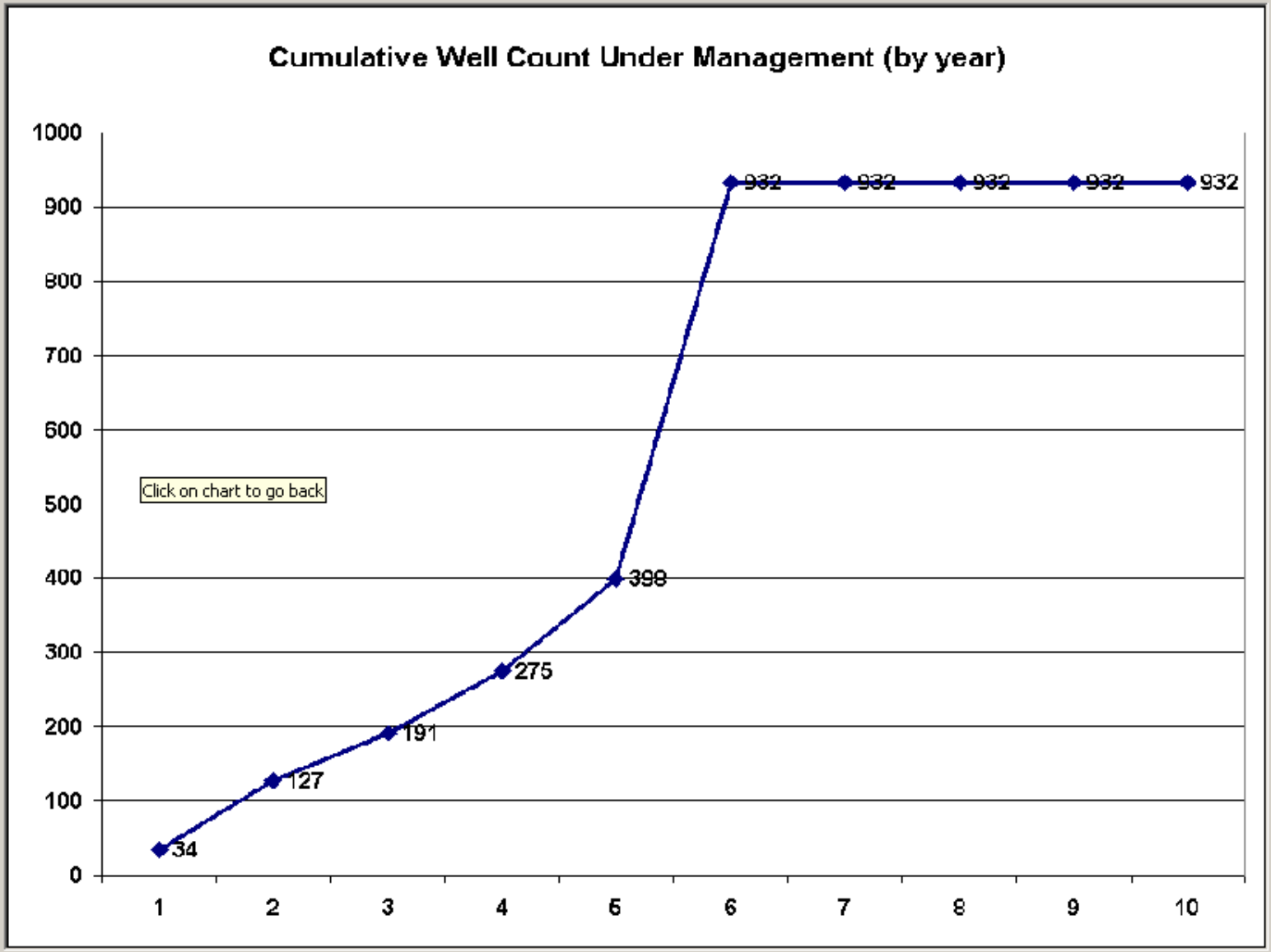




Wellhead Flow Added to Management (by Primary Use)

Close

Representative well breakdown - Click chart to go back



Close

Water Group Prototype

Menu

Images

2D View

3D View

Flow Details

Well Details

CreateOption

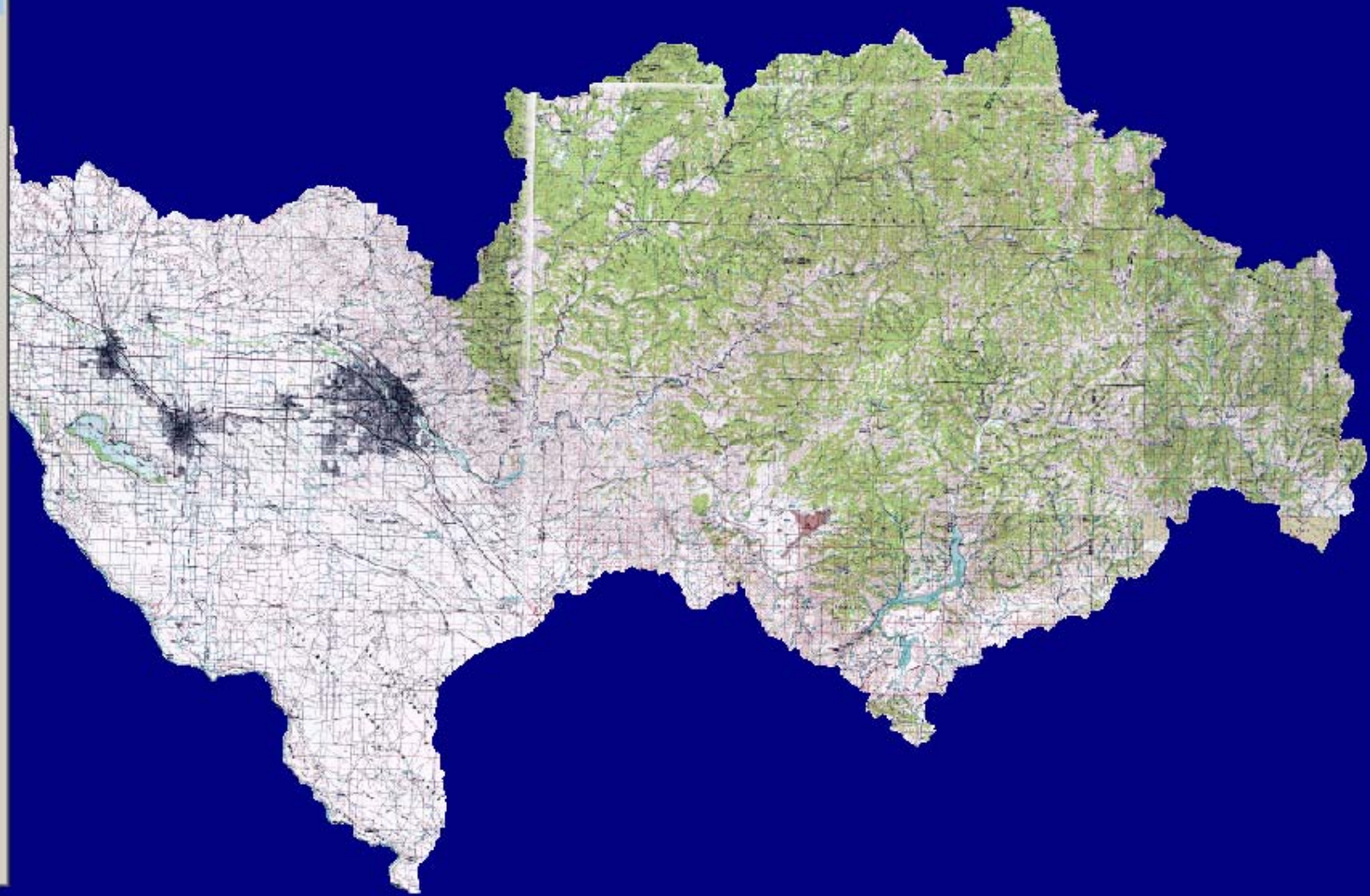
Impacts

Vote

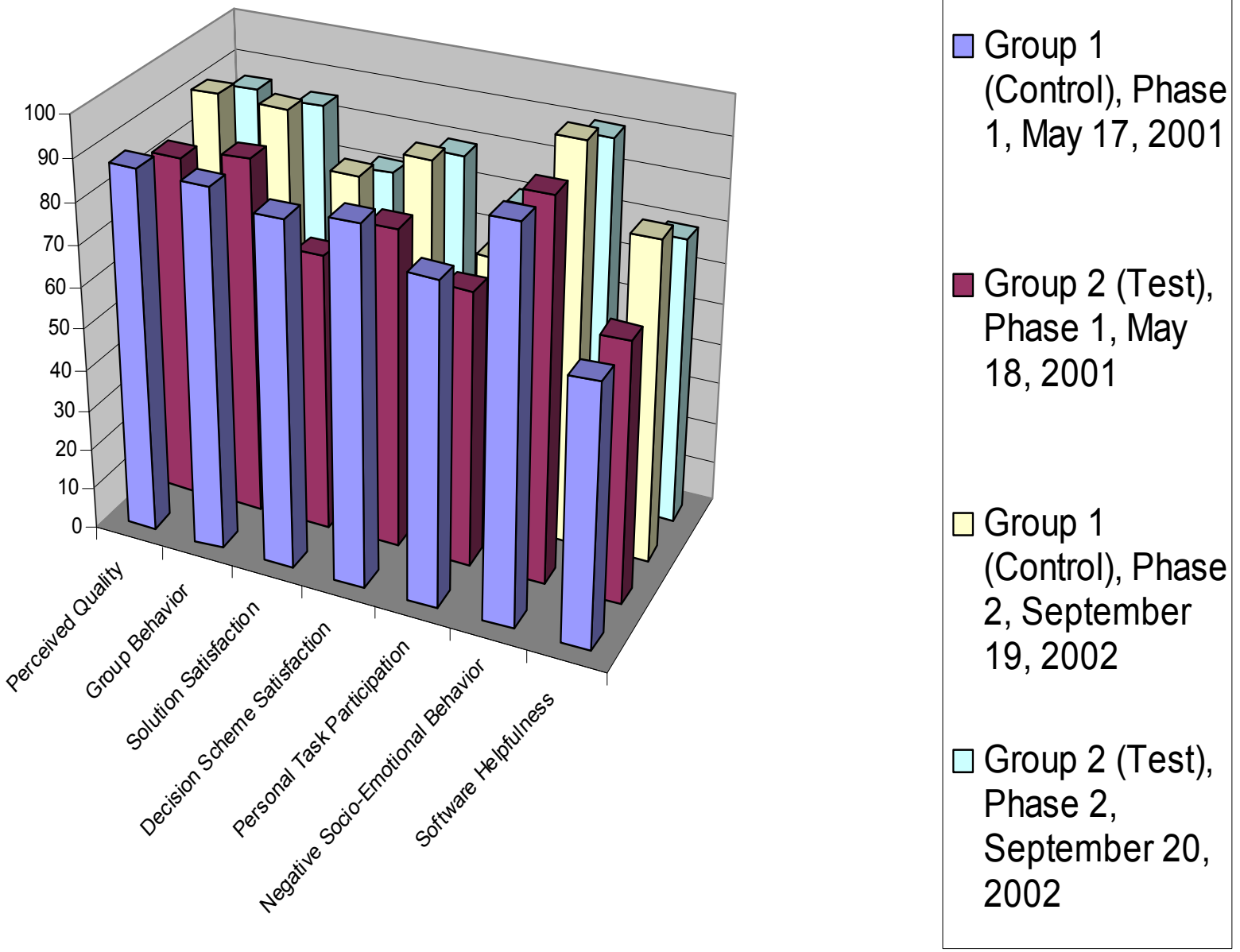
Message

Exit

Connect



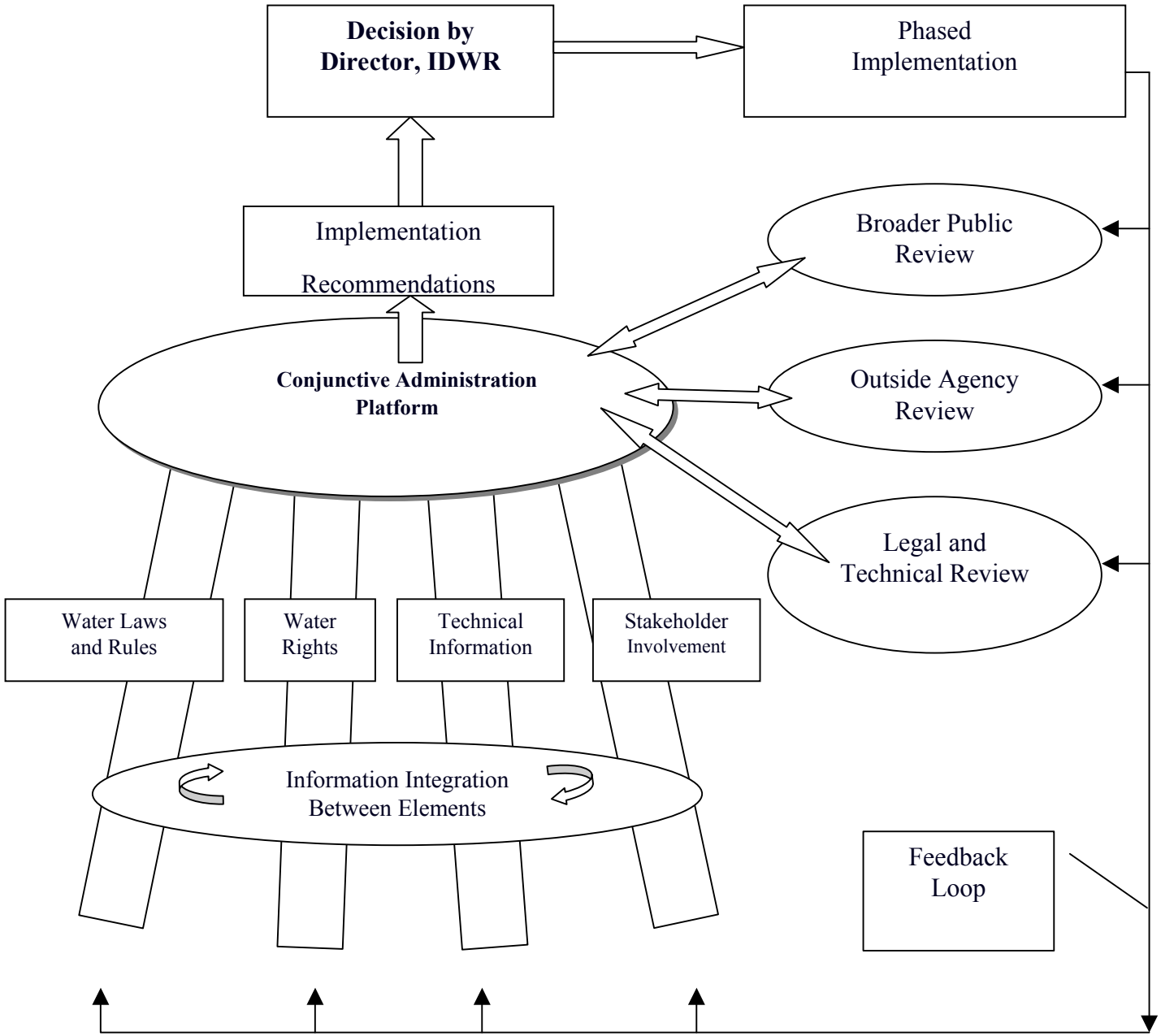
Comparison of Summary Data



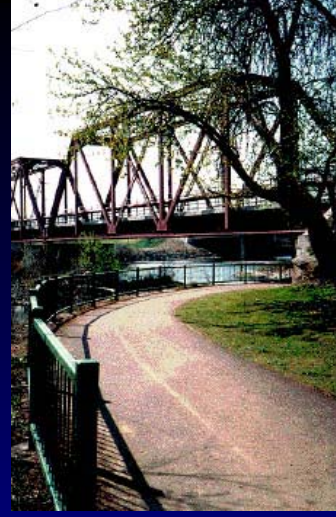
Next Steps

- Obtain follow-up direction from Director IDWR – Refine IDWR policy for the basin based on the new stakeholder input
- Conduct discussion sessions with attorneys and additional technical staff (Fall 2002)
- Continue lithographic, geochemical and submodel MODFLOW and MODRSP analysis in the Boise to Star area
- Refine response zones and incorporate with upgraded MikeBasin, to identify the specific water rights that are being impacted by ground water pumping in the CA area
- Notify the general public of the progress of this study as conference opportunities arise in the Boise River Basin
- Conduct a follow-up stakeholder session (11/ 2003)

Conceptual Conjunctive Administration Model



CA Implementation "A New Approach"



Identify a Candidate Area ***Prior*** to Lawsuit

Assemble Three Elements

Identify Stakeholders

Conduct a Collaborative Spatial Decision-Making Session

Brief State Director of Water Resources Agency RE: Results of Session

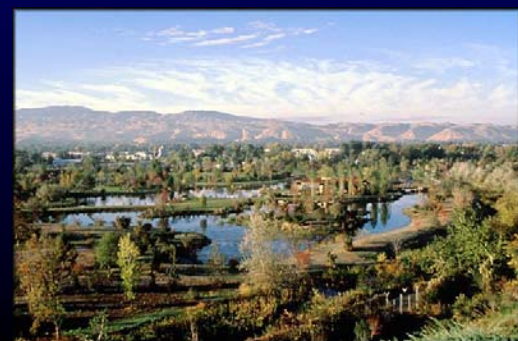
Pursue the Issue?

Yes

Initiate a Broader Legal and Technical Review

No --Done

Note: If candidate area spans more than one state, spend the first year of spatial collaboration with solely state and federal water resources professionals to develop common ground



Water Delivery in Idaho

Using Adjudication Results to Move toward Implementation of Conjunctive Administration